VOL. I. NO. 3. MARCH, 1906.

THE METAL INDUSTRY

WITH WHICH ARE INCORPORATED
THE ALUMINUM WORLD. THE BRASS FOUNDER AND FINISHER
AND ELECTRO-PLATERS REVIEW.

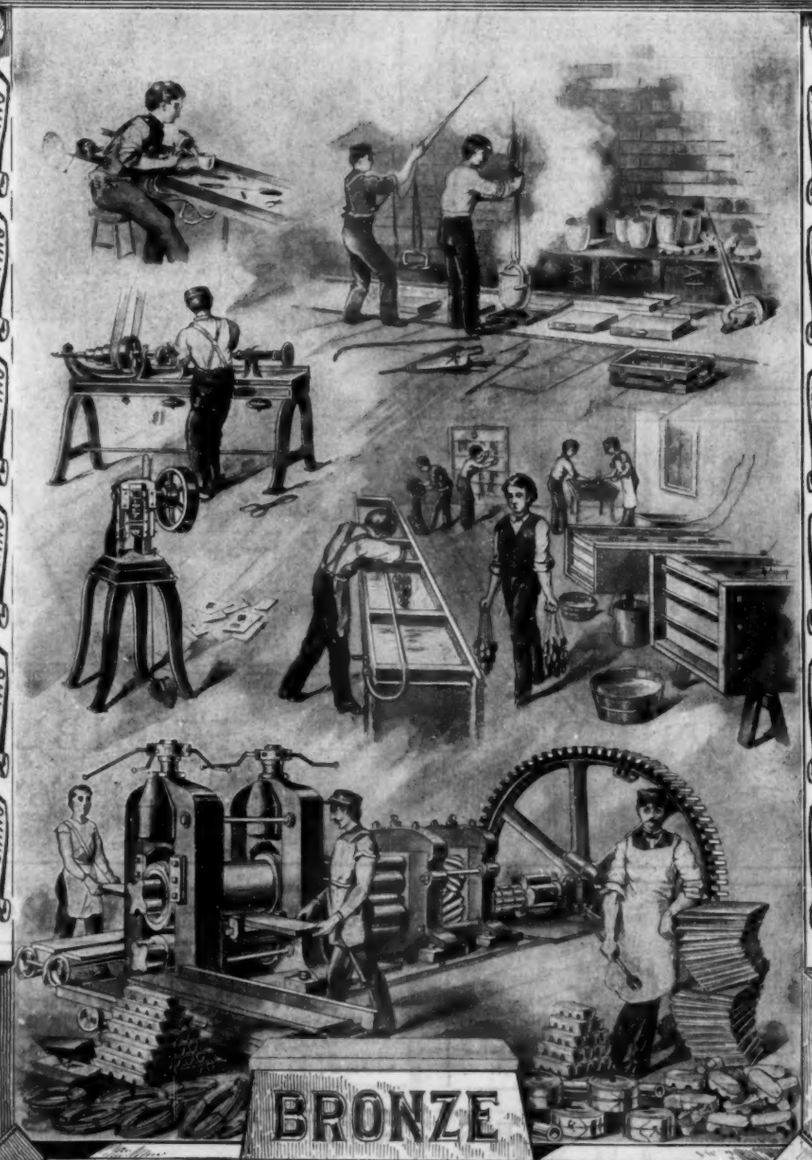
A TRADE JOURNAL RELATING TO THE NON-FERROUS METALS AND ALLOYS.

ALUMINUM · COPPER · NICKEL · TIN · SILVER · LEAD · GOLD · ZINC · BRONZE

METALLOGRAPHY · BRASS · METALLURGY

ROLLING · DRAWING · STAMPING · SPINNING · PLATING · POLISHING

SMELTING · REFINING · ALLOYING · CASTING · FOUNDING · FINISHING



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VOL. 12, NO. 3.

NEW YORK, MARCH, 1906.

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THE ALUMINUM WORLD
THE BRASS FOUNDER AND FINISHER
AND
ELECTRO PLATERS REVIEW

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THE END OF THE COPPER WAR.

The most interesting event of the last month from the standpoint of the metal working industry into which the use of copper enters largely was unquestionably that which took place on February 13th when all the mining properties controlled by F. A. Heinze were formally turned over to his old antagonist, the Amalgamated Copper Company. The stubborn fight which Mr. Heinze made against the Amalgamated Copper Company and the numerous suits which he instituted against them for the purpose of mining litigation are still fresh in the memory of all persons interested in the matter. It is reported that the peace thus made between the great warring interests involves a dismissal of over 100 law suits which involved $50,000,000 worth of claims. The closing up of the seven years' war is reported to have taken place on the consideration of a matter of some $25,000,000 in cash received by Mr. Heinze.

It is stated that a great holding company which is to include all the larger copper interests is likely now to become a fact and the closing of the war is considered to be the beginning of a community of interests which will play a role in the copper industry similar to that played by the United States Steel Corporation in the iron industry.

The understanding thus arrived at releases a number of valuable ore bodies, of which both Mr. Heinze and the Amalgamated Copper Company claimed ownership and which were either entirely or partially closed down by injunctions. Especially benefited in this case are the great mining properties of Anaconda and Parrot, which have been seriously affected for several years, inasmuch as Mr. Heinze claimed ownership of a large portion of the great vein in the Anaconda mine as well as of a considerable portion of the ore in the Parrot mine. Another one of the mines which is supposed to be one of the richest in the Butte, Mont., copper district, the Michael Devitt mine, has also been shut down by an injunction since 1904. Other properties affected are the Minnie Healy, the Nipper and other valuable mines. It is currently reported that the mines will be immediately opened and several thousand additional men will be put to work, and that the copper production of the Butte district will be largely increased in a short time.

When it is remembered that the production of the Heinze mines is estimated at nearly 40 million pounds of copper per annum, while it is reported that the yearly present output of the Amalgamated Copper Company is about 202 million pounds, the magnitude of the transaction is sufficiently evident. It remains to be seen what effect this consolidation of interests will have on the copper trade of the United States and of the whole world, as this country is by far and away the largest producer of copper in the world.

HIGH METAL PRICES.

A short time ago THE METAL INDUSTRY called attention to the fact that the high metal prices which have been ruling so long and especially that of copper have not been an unmixed blessing to the producers of metal goods for the market. Especially the smaller ones among those have suffered considerably because they could not ordinarily raise their prices without incurring the antagonism of their customers. At last, however, the inevitable has happened and they were forced to increase the prices on their goods in order to come out with a fair profit. It is on account of this that lamps, electroliers or other products of various kinds as well as the great mass of novelties which are so largely produced and in the making of which copper, tin and spelter enter to a large extent are advancing in price.

It is claimed that manufacturers in New York have already sent out notices to the retailers that their prices will be advanced. Nor is this condition of affairs limited to the United States, as it is stated on good authority that buyers for American houses which have returned from Germany and other European countries report that the prices of metal goods of the above description are considerably higher now than they were formerly. It is reported that advances in price are to be made on metal goods of from 10 to 25 per cent. The prices are also advancing on all classes of architectural supplies, ornamental work and goods of similar kind, as well as on metal clocks, lamps, etc. The action had to be expected, as it is a well known fact that the manufacturers had to take this step in order to protect themselves and to prevent their actually losing money on their sales, as they have been working for some time on a very small margin of profit.

DYNAMOS FOR ELECTROPLATING.

It is needless to call attention to the fact that the dynamo is the main spring of the plating establishment and that it behoves the plater when looking around for a machine to give the subject the most careful attention. It is not so very long ago that almost any machine manufactured by an electrical firm with no particular experience in the plating business was considered satisfactory for plating purposes. This condition of affairs, however, does not longer prevail. It is recognized that the dynamo to be suitable for plating must be constructed in such a manner that it can perform its work properly and must be especially designed for the purpose. Placed, as such machines usually are, in a corner of the plating room and run by attendants unskilled in electrical matters, they have to be primarily constructed with a view of their performing their duty satisfactorily with a minimum of supervision. They must also be made so that they can take varying loads without much trouble, must have ample contact surfaces and must be provided with a sufficient amount of wearing surface so that they can stand the rough uses to which they are subjected.

It is not too much to state that the building of plating dynamos has become as much a specialty as the building of electric machinery for power purposes, railway work, electric lighting, etc. It should, therefore, be the first consideration of the plater when intending to install a dynamo or to change his outfit to get into communication with a firm which has experience in that particular line, so that he can get a machine which will be satisfactory for the purpose for which he intends using it, namely, for plating. The first cost of a plating dynamo is certainly not a prime consideration and money invested in a good machine will amply be repaid by the decreased cost of running, repairs and supervision.

PRODUCTION OF A CONDUCTIVE SURFACE ON NON-METALLIC SURFACES.

There are several methods of producing a conductive surface on non-metallic surfaces. For plaster work after the plaster is soaked in paraffine wax and blackleaded, the moulding is placed in a bath of acid sulphate of copper. Very finely divided particles of iron dust are then sprinkled on the surface of the mould and more especially in the cavities. This operation produces a slight deposit of copper by the chemical action of the iron on the copper sulphate solution. This procedure makes the surface more freely conductive in the regular plating bath.

Another method consists of coating the mould with air drying Japan thinned with benzol. While the coating is still sticky the surface is covered with copper bronze powder. When thoroughly dry the excess of bronze powder is removed with a camel's-hair brush.

Another method which is used by some people consists of dissolving nitrate of silver in alcohol. This solution is flowed into the mould and the latter is then enclosed in a receptacle where fumes of sulphuretted hydrogen can act on the silver, thus producing silver sulphide. This method is claimed to give good results.

The copper bronze method outlined above is used very successfully.

A British exchange calls attention to the fact that it is 50 years ago that the chemist Dumas presented the Academy of Sciences with the first kilo of aluminum. It is stated that the first article made of aluminum was a hemlet for the King of Denmark which Dumas exhibited in 1857.

THE RECOVERY OF BRASS FROM FOUNDRY REFUSE.

By W. M. Corse.

The refuse from a brass foundry is obtained from several sources. Some of it should undergo a preliminary treatment before being taken to the wash room, while some can be taken there as it is collected. Each source will be considered separately in order to show where such preliminary treatment can be made to advantage.

The burnt core sand from the rapping out bench in the cleaning room should be riddled, the coarse brass separated from the core wires and returned to the metal room. The material passing through the riddle may be sent to the wash room, but it generally contains too small a percentage of metal to pay for further recovery. A considerable amount should however be sent there periodically to verify this condition, for with small work enough may pass through the riddle to make it necessary to wash this material.

The sand from the dipping tub and from the traps under the tumbling barrels should be taken direct to the washer. It does not need to be put through the crusher, as it contains no hard lumps.

The sweepings of the floor from around the molding tubs, machines or pouring skids should be riddled through a No. 12 riddle in the foundry and the large pieces of brass picked out and sent to the metal room. The remainder on the riddle should be sent to the wash room and the molding sand passing through should be returned to the sand pile. Any fine brass which passes through the riddle goes to the sand pile and gradually finds its way to the wash room through rejected sand. Such floor sweepings as contain core prints and flour should be sent to the wash room directly, as these materials interfere with the satisfactory working of the sand.

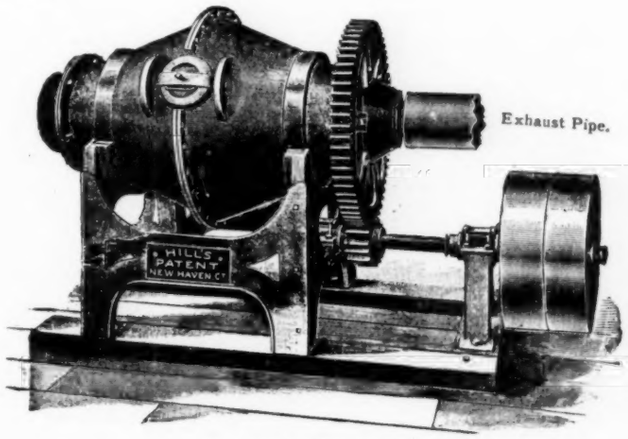
The floor sweepings from around the furnaces should also be sent to the wash room direct, after picking out the large pieces of brass. This material generally contains skimmings, ashes and slag which have to be put through the crusher.

There remains one more class of material, viz.: ashes from the crucible pit and slag and skimmings from the oil furnaces in case the latter form part of the furnace equipment. This class requires no preliminary treatment.

The wash room should have a concrete or cement floor and should be large enough to accommodate a crusher and a jig or classifier and still leave room for a week's supply of refuse. The man in charge of the wash room should not be cramped for floor space, as the cleaned brass should be spread out to dry before being weighed back to the metal room. Moreover, an accurate record of the weekly output of the wash room cannot be kept if the space for refuse is too small.

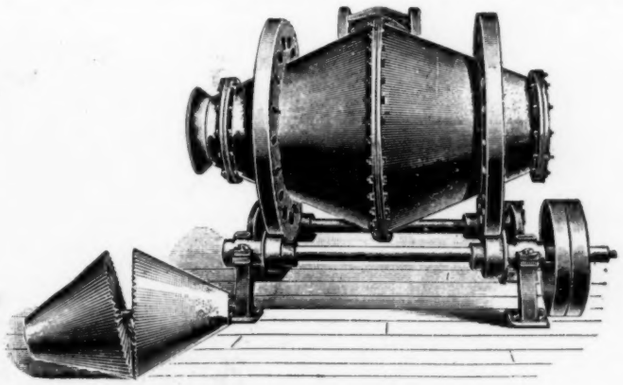
There are several styles of crushers which answer the purpose admirably. The Hill crusher, one of the earliest makes, seems to be most generally used. It consists of a cast iron shell in the shape of two cones arranged base to base, in which is placed a solid iron weight or roller of similar shape. This, as well as other styles of crushers, can be operated by the wet method or the dry exhaust method, as the user may choose. The wet method seems to be generally preferred, although the dry method is much neater.

In the wet method the water enters at one end of the crusher and the material to be crushed is shoveled in at the other end. The tailings are carried out at the charging end by the water, while the concentrates are removed through a door in the side. In the dry method the tailings are sucked through one end by the air. The material to be crushed is shoveled in at the opposite end and the concentrates are removed through a side door, as in the wet method.



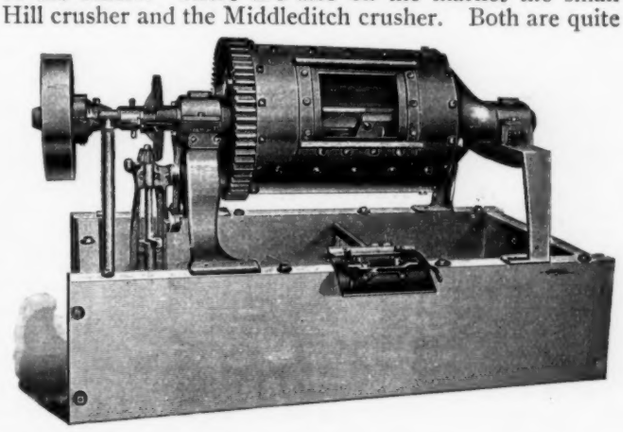
THE HILL CRUSHER.

The Monarch crusher is similar to the Hill. The main point of difference is in the weight or roller which consists of two pieces held together by a rod. The Sly crusher



THE MONARCH CRUSHER.

is cylindrical and carries a weight different from either of the others. There are also on the market the small Hill crusher and the Middleditch crusher. Both are quite



THE SLY CRUSHER.

similar, the Hill being the smaller. They are suitable for refuse which contains small lumps of relatively soft material.

When the charge, which should be shoveled in gradually, is crushed so that the particles of brass are separated from the slag or clinker, the machine is stopped and the concentrates are dumped out. They are then riddled through a ¼ in. riddle in order to remove the coarser particles of brass. The core wires are removed from the coarse brass with the aid of a magnet, any foreign matter is picked out and the clean brass is sent direct to the metal room.

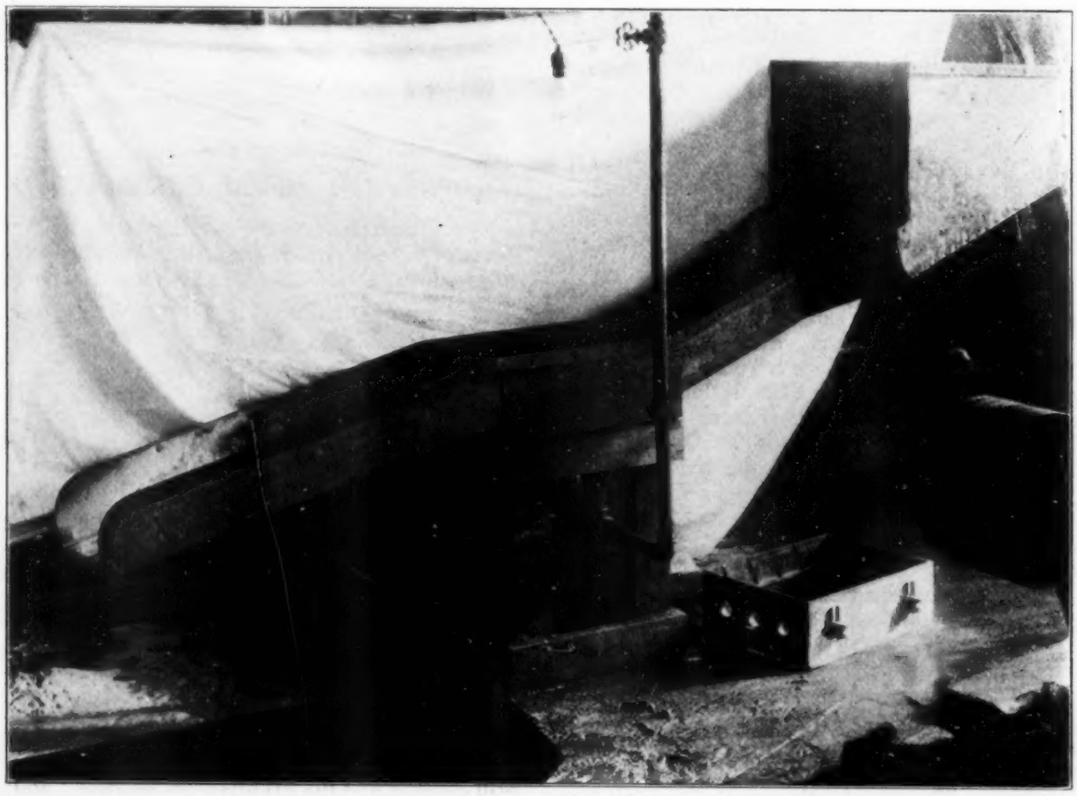
The material which passes the ¼ in. riddle is then ready to be treated by any one of several methods to effect the final separation of the metal from the dirt. The most common method is to put the mixture of brass and dirt into a fine riddle and jig it by hand under the surface of the water in a tank. Agitation by power may replace hand washing. The movement of the riddle agitates the particles and the brass, being heavier than the dirt, settles to the bottom of the riddle, while the dirt remains on top. The riddle is now taken from the tank and the top layer of dirt is removed with a scraper. This dirt, or tailings, is kept in barrels to be sold to the refiner, who can remove by smelting processes the last traces of brass which it contains. The middle layer is generally a mixture of brass and dirt, and is scraped off and returned to the crusher. The bottom layer is clean brass which after drying is returned to the metal room. A magnetic separator puts this metal in shape to be charged directly to the furnaces.

The material which passes through the riddle is richer in brass than the first scrapings and can be added to them, as there is nothing further that can be done to it profitably. If it is kept separate, a higher price can be obtained from the refiner, but it is better to mix the two kinds of tailings and sell them on the average copper content.

It may be said here that no figures representing the loss of brass can be given which will apply to every foundry, since the amount of brass that passes into the tailings depends, all conditions of operation remaining the same, upon the amount of grinding and finishing which is done in the shop. Foundries that sell the majority of their castings in the rough have a relatively small amount of fine brass in their refuse, while those that finish most of their castings themselves have a relatively large percentage. If, however, in the former case, turnings or chips are bought and used in the mixture, then some of these will appear in the tailings.

Another method for separating the brass from the dirt, slightly different from the first, is to construct a wooden or metal tank about twice as long as it is wide and divide it into two square sections by a partition which reaches to within a few inches of the top. A fine wire rectangular riddle is suspended over one section by a hinge at the back end and a rod at the front. The front edge should be directly over the partition. The rod is connected to an eccentric overhead, which gives the riddle a shaking motion up and down. The riddle is inclined from back to front and across the front is fastened a strip about an inch or two high.

The mixture of brass and dirt is put into this riddle and the shaking mechanism started. The tank is filled with water until the whole bottom of the riddle is submerged. The agitation separates the brass from the dirt as before, but the dirt in this case falls into the second section of the tank, the operation being continued until the brass reaches the top edge of the strip on the front of the riddle. The shaking is then discontinued, the



*HYDRAULIC CLASSIFIER FOR BRASS FOUNDRY WASH ROOM.

*Made by B. Middleditch, Detroit, Mich.

riddle raised, the top dirt scraped off and the clean brass taken out. If it is decided to mix the two kinds of tailings the partition in the tank is not necessary.

The third, and best method, is to use a hydraulic classifier. This classifier consists of an inclined iron trough with a conical hopper inserted half way between the top and bottom. On the bottom of hopper is a T, pointed up. Into one side of the T is connected a pipe from the bottom of a tank of water situated about 20 or 30 feet above the apparatus. The overflow from this tank is piped to the top of the trough and serves the double purpose of telling when the tank is full and washing the mixture of brass and dirt down the trough. A constant head of water is essential. Into the other side of the T is inserted a nozzle.

The sizes of the three openings in the T are such that the water entering under constant pressure at the one side cannot escape as rapidly through the nozzle, and thus creates an upward pressure in the hopper. This upward pressure is regulated by a valve in the pipe from the tank and when the right pressure to wash all the dirt away has been found, it should never be changed until the average size of the particles of brass and dirt changes. As the concentrates from the crusher are washed slowly down into the hopper, the upward pressure of the water washes the dirt out and down the trough into a receiving tank, while the brass drops into the T and is carried out through the nozzle into another smaller tank. When the water pressure is regulated properly, no dirt will go through the nozzle, and the brass issuing there will be cleaner than that obtained by either of the two other methods.

As stated before, the percentage of brass which cannot be recovered by any of the methods described, varies with the class of work made and the amount of finishing done. In general, it may be stated that the more grinding and finishing done, the higher will be the copper content of the tailings. It may run as low as 3 or 4 per cent. of copper, but the average founder will find it to be nearer 15 per cent.

There are still many brass founders who sell their refuse to junk dealers or refiners, but the brass foundryman who is up-to-date is coming to realize that the chances of loss taken on such a sale are very great and the result has been that every year sees an increasing number of wash rooms equipped. Such an equipment saves all the metal that is possible to save at a small cost, and, furthermore, the founder knows exactly what its composition is, having made the mixtures himself.

Samples of tailings should be sent regularly to the foundry chemist or to an outside testing laboratory in order to check the man in charge of the wash room and also to give the founder the copper content on which to base the selling price.

This is one of many phases of brass foundry practice which is being brought up to a scientific level. The continuance of this kind of work means that the brass foundry will soon take its rightful place alongside the iron foundry and the steel mill, a result which can only be obtained by the hearty co-operation of everyone concerned, whether he be manager, chemist or practical foundryman.

Commercial tin ingots usually contain from 0.1 to 0.2 per cent. of impurities, while in the case of second qualities the percentage of impurities may reach 1 to 2 per cent. The foreign materials principally met with in tin are iron, lead and copper, but the following may also be present in small quantities: arsenic, antimony, tungsten, molybdenum, bismuth, zinc, manganese, nickel, chromium and sulphur.

WORKING WITH WAX MOLDS.

By D. J. Lemal.

If more attention were paid to working with wax the making of many articles in foundry work would be simplified and a great deal of time saved. For example in the making of ornamental work, I know of some firms, who, for instance, require the simple design of egg and dart applied to a pattern ten feet long. They would have a piece, 15 inches long, of the design carved in wood. This operation would take one day of the carver's time, as he had to execute it well in point of cleanliness and draft. That piece would then go to the foundry, where a sufficient number of pieces would be cast in white metal to cover the pattern. These, however, would be too rough to mold from, and therefore they have to be turned over to a metal finisher for the purpose of smoothing them up. The operation of finishing the pattern up would require a couple of days more. These pieces would be fixed loose on the patterns so that when the latter was lifted, the metallic pieces would remain in the sand. If there was more than one piece wanted of each pattern, the metal pieces would have to be re-arranged each time. All this work was done because the people did not know that they could do better.

The method which I adopt by use of wax is as follows: I model out of plasteline or clay one egg with two half darts attached to it. I then take a cast of this in plaster and take as many impression pieces out of this in plasteline or clay as required. I fit them together on a slab and make a piece about 15 inches long. I then make my regular mold in plaster over this. When doing this I take care to let the plaster flow about 3 inches on all sides of the mold. After the plaster is hard I turn the mold down-side up without emptying it of the plasteline or clay. If some of the latter should have adhered to the slab I replace it in the mold and smooth it all well over. Then on one side in the plaster I make two or three holes about ½ inch deep with a ¾-inch gouge, to serve as dowel holes. I now coat this face of plaster with soft soap, which can be made by shaving soap and beating it like one would an egg with an egg beater. I usually beat mine with a brush. It may also be done by letting the soap dissolve by itself in a little water, which operation will take several hours. I coat the plaster with the soap, in order that the plaster which is to be applied in the next operation will not stick to the mold.

The mold is now ready to have a wall built around it either with pieces of wood or clay. The wall should be about two inches high and about the same thickness as the mold. Then I fill this or cover the mold with plaster, which makes the back of the mold. After this has set and after the wall has been taken off, the two pieces should separate readily after half an hour after the plaster has been poured on. If they should not separate they can be easily made to do so by inserting a chisel lightly in the joint.

The mold should then be emptied of the plasteline or clay and a channel should be made with a ¾-inch gouge along the length of the mold about ½ inch from the ornament. It should turn at one end into the ornament, so that when the mold is closed and stood on one end, while pouring the melted wax, the latter will enter into the ornament at the bottom and rise. In doing this it drives out the air so that it will be necessary to cut another small channel coming out of the ornament at the opposite end, to act as a vent. Before the wax is poured in, the mold and the back should be lightly

clamped together so that the wax does not stick to the mold. The mold and back should also be well soaked in water until they do not absorb any more. This can be ascertained by taking the mold out of the water and placing it near the ear. It is then easy to hear if the plaster is absorbing any water.

The temperature of the wax should be such that a finger can be put in without burning it, but it should be just on the point of doing so. The best wax for general work consists of two parts pure bee's wax and one part of rosin, nothing else. An agate tea pot is handy to melt the wax in and pour from. I should have mentioned before that the water should be well dried out of the mold before the wax is being poured. This can be done with a small sponge or foundry bellows, and as soon as the operator sees the wax casting sticking a little to the mold it should be re-soaked before casting any more. It is possible to turn a piece of casting out of such a mold every ten minutes. The time to get such a mold ready will be about a day, so that in this respect it compares very favorably with the time taken in making the white metal molds mentioned above. Besides that the casting of the wax can be done by boys.

The wax castings are fastened on the pattern with very thick shellac and small nails. Afterwards the joints are gone over and smoothed with a modelling stick. In order that the sand does not stick to the wax a coat of thin shellac is given to the work. By warming the wax castings they can be applied to any shape. There are a great many other uses for this wax work, such as casting large ornamental pieces of certain thickness, or straight and twisted moldings, that would take five times longer if they were modeled or carved. In grill work the wax casting process is also of the greatest value, especially where scrolls are in the work.

SHEATHING METAL.

By Thomas Clare.

Sheathing metal (Muntz metal) is a low grade of brass which contains a large percentage of spelter. About equal parts of copper and spelter are used in making it. It is melted in a large air furnace and generally several tons are made at one time. The furnace is lined with fire brick and is built with a sort of well in front, in order to facilitate the ladling-out of the metal when ready to pour off. The yellow metal scrap and the copper are melted first and then the spelter is added. The whole mass is then thoroughly mixed. In order to do this, which is a most important condition, a long and strong iron rake is used. An iron roller is placed across the mouth of the furnace and this makes it very easy for a man to rabble the metal after it is mixed.

A small sample is taken out which is cooled off in water and then broken in order to show the fracture. If the grain of the metal is not what is desired, namely, a uniform close grain, more scrap metal or spelter is thrown in and is thoroughly mixed with the molten mass. Then another sample is taken out and tried and the operation is repeated until the desired effect has been obtained. The testing must be done by an expert. The metal is then ladled out into open molds. When the metal is poured off great care is taken not to get it too hot. If it is too hot the grain is too coarse and this is undesirable in sheathing metal. The grain must be very dense and the closer the grain, the better the metal will roll. Yellow metal is poured off at as low temperature as is consistent with getting it thoroughly mixed.

I have been told by some men that yellow metal is a composition of 60 pounds of copper and 40 pounds of spelter, but I do not think so. As a matter of fact 60 per cent. copper and 40 per cent. zinc is what is called high brass in the trade and hundreds of tons of brass sheets are made from this formula which is rolled cold. The cost of the manufacture of brass sheets is far in excess of sheathing metal sheets, which is rolled while red hot. Moreover, it is possible to cast several tons of yellow metal at one time, whereas in making high brass a crucible is used, and is cast in 100 pound to 150 pound melts. This again brings up the cost of the high brass to a high figure when compared with the cost of making yellow metal. I mention this simply to show that the mixture for sheathing metal (Muntz metal) and high brass cannot be the same. In fact, I don't think high brass would stand sea water and the weather conditions nearly as well as yellow metal does.

It is a curious fact that although yellow metal will not break down when cold, this can be done after the metal has been rolled down to some extent. It will then roll cold, but great care has to be exercised in the rolling. I myself have taken the metal when rolled hot to 27 B. & S. gauge and rolled it to 36 B. & S. gauge.

The uses of yellow metal are many and varied. In fact, it is taking the place in many instances of good brass (high brass). It was first made by Mr. Muntz for sheathing vessels on account of its great resistance to the action of sea water. It, however, has lost some of its importance in that line owing to the introduction of iron for sheathing war vessels.

By far the most important use it is put to to-day is for condensing plates used on steamships of all descriptions. It is also used for solid or seamless tubes and pin and rivet wire. It is taking the place of copper sheets for roofing and conductors. Then again it is used in the jewelry trade for lining small articles in silver and plate, as it gives the articles strength and weight. It has also been tried in making pinchbeck jewelry, but in many of the parts it would not work as the metal was not pliable enough to be struck up under the drop hammer or the press. It could only be used for things quite plain.

NEW NICKEL-COPPER ALLOY.

An alloy which possesses many valuable properties is claimed to be produced by smelting ores containing nickel and copper. The process consists in smelting ore containing sulphide of nickel and copper and bessemerizing the resultant matte. This is then calcined in order to obtain the nickel and copper in the form of oxides. The latter are reduced in a reverberatory furnace with carbon or the like so as to produce an alloy which preferably contains two parts of nickel and one of copper. Iron may be added in small proportions up to ten per cent. if desired.

It is claimed that such an alloy is cheaper to work and reduce into sheet than copper and is much stronger than the latter metal and freely malleable even when cast. It is claimed that it can be used for the manufacture of roofing plates, ship plates, castings, fittings, propellers and other uses where a great strength and freedom from corrosion are required. It may also be used advantageously in the manufacture of non-corrodible boiler tubes. The process has been patented by A. Monell, of New York, with U. S. patent 811,239, of January 30, 1906.

The ancients found that an alloy of copper and tin was much harder than copper and was much used by them for swords, spears and hatchets.

THE VERDE ANTIQUE FINISH—GENUINE VS. IMITATION.

By Chas. H. Proctor.

The verde antique finish is still quite predominating as a finish for artistic metal goods. Owing to its popularity it is likely to remain so for some time to come.

In the January, 1905, issue of The Metal Industry the writer gave his ideas in regard to producing the various verde antique finishes by the aid of pigments. He is pleased to note that the method given has been successfully applied to many and various lines of artistic goods. The verde antique finishes produced at the present time may be divided into the genuine and the imitation. A genuine finish is produced by dilute acids and saline solutions which act directly upon the surface of the metals, principally on those of copper or its alloys. In this case they produce basic copper carbonate or chloride, the particular form depending upon whether the effect produced should be that of the atmosphere or the earth.

The method of making an imitation finish consists in applying pigments, namely, principally the chrome greens and yellows, blue, black and white to the surface of the metal and combining these colors in such a manner that any effect may be produced upon any metal, in order to produce the imitation effects of the attack of the earth and the air. Many beautiful effects have been produced by this method.

LEAD AND ANTIMONY WALL BRACKET, COPPER PLATED AND FINISHED IN LIGHT VERDE, TWO IMMERSIONS.

In order to observe the genuine verde antique finish it is necessary to visit some institution such as the Metropolitan Museum of Art in New York or others of like character and to observe the relics of years ago which have lain in the earth for centuries. The writer has made many experiments in an endeavor to find a good solution of producing the verde antique finish by the corrosion method, namely, a finish which could be used on several of the non-copper alloys and on iron by first coating them with copper or bronze. Very little success, however, was obtained in those experiments owing to the corrosive action of the solution. Unsightly spots were produced and in many cases the metal was corroded off altogether and the deposit removed.

As the writer was desirous of obtaining a good antique solution he made several visits to the Metropolitan Museum of Art in order to make a study of the effect of color produced by the corroding influence of the effect of time. He endeavored to produce a solution by immersion that would give as near an effect to the metal to which it was applied as nature herself had accomplished. From numerous experiments made the writer has selected one formula that has given better results than any that he has heretofore come in contact with. This solution may be applied to copper, bronze, brass or to work plated with these metals and will produce good results. It may be used with perfect satisfaction in all such cases where it is desired to produce the genuine effect by the corrosion method.

The solution consists of the following formula on a 5 gallon basis: dry chloride of zinc 5 pounds, sal ammoniac 2½ pounds, sulphate of copper 10 ounces, hydrochloric acid 5 ounces, commercial glycerine 2½ ounces, water 5 gallons. It should be mixed up in the order mentioned. The solution should be used at a temperature of 100 degrees F., although it will produce good results if used a little warmer or cooler. The following

LEAD AND ANTIMONY WALL BRACKET, COPPER PLATED AND FINISHED IN DARK VERDE, FOUR IMMERSIONS.

method should be used in handling the articles for the verde finish. Copper or bronze have been found the best metals for obtaining the finish, although brass may be used. Articles of zinc, iron and the antimony lead alloys should be copper plated. A fairly good deposit should be applied not less than that produced in half an hour in the acid sulphate solution and at least ¾ to 1 hour in the cyanide bath.

The rougher the articles are, the more antique is the effect, although very smooth surfaces, especially on the soft metals, give rich effects. After the articles are copper plated they should be immersed in a cold solution of sulphuret of potassium, containing 1½ to 2 ounces to the gallon of water with a little ammonia water. The articles should be left in the solution until they are uniformly oxidized. They should then be washed and passed through boiling water and should then be introduced directly into the verde antique solution. They should remain in this solution for one-half minute and should then be removed and put into a warm place to dry. In ten minutes the surface will commence to assume a greenish shade. In fifteen minutes the articles may be passed through boiling water when the green rust will

appear dense. A second immersion should then be given in the verde solution. After drying the second time the articles will be found to show a beautiful verde green.

If a more dense and deeper green is desired, a third immersion should be given the articles without passing them through the hot water again. When the green is of sufficient density the articles should be carefully dried and small and even spots of copper should show. The relief work may be done by using dry pumice stone. The articles should afterwards be lacquered with a colorless transparent lacquer diluted rather more than for regular work. This method does not produce lustre, but acts as a binder for the verde green. If a softer lustre is required the green may be polished by using a very small amount of beeswax, dissolved in turpentine to the consistency of shoe polish and applied to canton flannel.

The verde greens produced by this method are very beautiful and approach very closely the genuine articles, which may be easily recognized owing to the beautiful blended tones.

SILVER PLATING WITH THE USE OF A SAMPLE PLATE.

By Daniel Wittig.

It is a surprise to find out how many silver platers do their work without having the least idea regarding the thickness of the deposit which they obtain. No matter what the conditions are they plate the work for a certain time and this time is their only guide. In large shops where the scales are used they have of course control of the deposits and they are nearly uniform on the different grades of work. In job shops, however, where the work is different almost every day and where different grades and sizes of work are plated in one tank, it would be hard to estimate how much silver would be necessary for a good, medium or light plate.

As the conditions are not always the same, plating the work for certain time could not be depended upon. Where meters are used, they can only tell how much metal can be deposited on a certain surface in a given time. If a job plater had to figure out the surface of every job he plates or the amount of silver to be deposited on the various pieces he plates every day, he would have to spend all his time figuring instead of plating.

The writer has used a simple device for over 18 years, namely, a sample plate, and he never puts in a batch of work without using such a plate. The latter is a plain clean polished piece of steel about 4 to 5 inches long and ½ inch wide by 1-16 inch thick. It is securely fastened to a copper wire. This piece of steel is *not* dipped, scoured or brushed with any cleaning material, but is merely kept clean with a piece of emery cloth. It is struck up with a piece of work and hung into the plating tank. It will take the deposit in the same manner as the cleaned work, but the deposit will not adhere firmly and can be sliced off.

After the work has been plating for some time the operator lifts the plate from the solution and tries to remove the skin plated upon it with the aid of a sharp knife. This will show the thickness of the deposit. When the plate shows a sufficient deposit for a light plate, such work is removed and the rest of the work is allowed to continue to plate until the sample plate shows that the deposit is heavy enough for the class of work which is to be done. A plater needs but very little practice in order to be able to judge the different deposits. The sample plate will always show the thickness of the deposit whether the solution plates fast or slow under the various conditions.

It has oftened happened to the writer that a tank had become disconnected while a batch of work was being plated. If he had relied on plating the work for a certain length of time, he might have finished it up with but a very light plate, perhaps a trifle more than the striking. No matter what the conditions are, the sample plate will show the thickness of the deposit. Where a heavy, durable plate is desired, the plater must know the thickness of the deposit.

If that part on the sample plate that was skinned does not plate again, the plater can make up his mind that he has not enough power for the amount of work being plated or that the solution is not plating freely. This will occur when there is not enough anode surface for the amount of work plating or when the solution is low in silver or cyanide. After all the work is removed from the solution, the plate is skinned, that is to say, the part below the holes used for wiring. The rest is only cleaned when the deposit becomes too thick. The silver which is scraped off is kept in a box and quite an amount will accumulate when plating is being done every day. Should the sample plate become dirty or corroded, it is cleaned with a piece of emery cloth.

A good contact is absolutely necessary. The operator should also see that the cathode rod is clean and that the sample plate is securely fastened. Where a flash or coloring is only desired, the sample plate is not used. Where a certain thickness is required on standard work the samples are kept for comparison. No matter what device a workman may take up, it takes a little time and practice to become acquainted with it. The sample plate can also be used in cyanide copper or brass solutions, but it is intended only for the silver bath.

SILVERING METALLIC OBJECTS.

A recent invention patented by Walter Bölsterli, of Winterthur, Switzerland, with U. S. patent 809,278 of January 9, 1906, has for its object the process of producing a solution of pure silver salts which is to be rubbed on the object to be silvered. It is intended to form upon the objects a deposit of fine metallic silver as a substitute for galvanic silvering or electroplating.

The solution is produced in the following manner: In about 30 liters of water there is dissolved 0.8 kilogram of silver nitrate. This is precipitated as silver chloride with diluted hydrochloric acid of 12 per cent. strength. The silver chloride is well washed and the precipitated chloride of silver is dissolved in a solution of about 30 liters of water and 3.3 kilograms of hyposulfite of soda, which solution has been made up separately. There is next mixed with the solution thus obtained, with stirring, 1.8 kilograms of caustic ammonia (8 per cent.) and then 8 kilograms of finely powdered Spanish whiting.

When this solution is rubbed upon the clean surface of the object to be silvered by means of a buckskin or linen cloth or on the recessed parts with a brush, or if it is rubbed in until it becomes dry and is washed afterwards with water and then rubbed dry with a woolen rag, a brilliant deposit of metallic fine silver is stated to be obtained. The solution is said to be especially suited for polishing or silvering plates, instruments, etc., of argentan, Christofel, Britannia., German silver, etc.

Phosphorus combines readily with molten copper, but small proportions of the element have no injurious effects. Larger amounts, however, over 0.5 per cent., render it red-short.

THE VENTILATION OF AMERICAN SHOPS.

By Walter B. Snow.

In the August, 1905, issue of The Metal Industry I notice a description of recent British methods of ventilating metal working establishments and I believe it will be of interest to your readers the world over, to mention something about modern American practice of shop ventilating, for the past decade has witnessed a most remarkable advance in the improvement of working conditions for the operatives in our manufacturing establishments. While the manufacturer has to a great extent voluntarily introduced such improvements, and has witnessed in their introduction an increase in the efficiency and longevity of his workers, the pressure of the law has in many cases been necessary to force him to meet the requirements. Under the direction of factory inspectors or officials of the State board of police much new legislation has been put into effect in many States. Precautions against accident have been taken, machines and elevators have been protected, and ventilating systems have been installed for keeping the air pure and removing objectional fumes or dust.

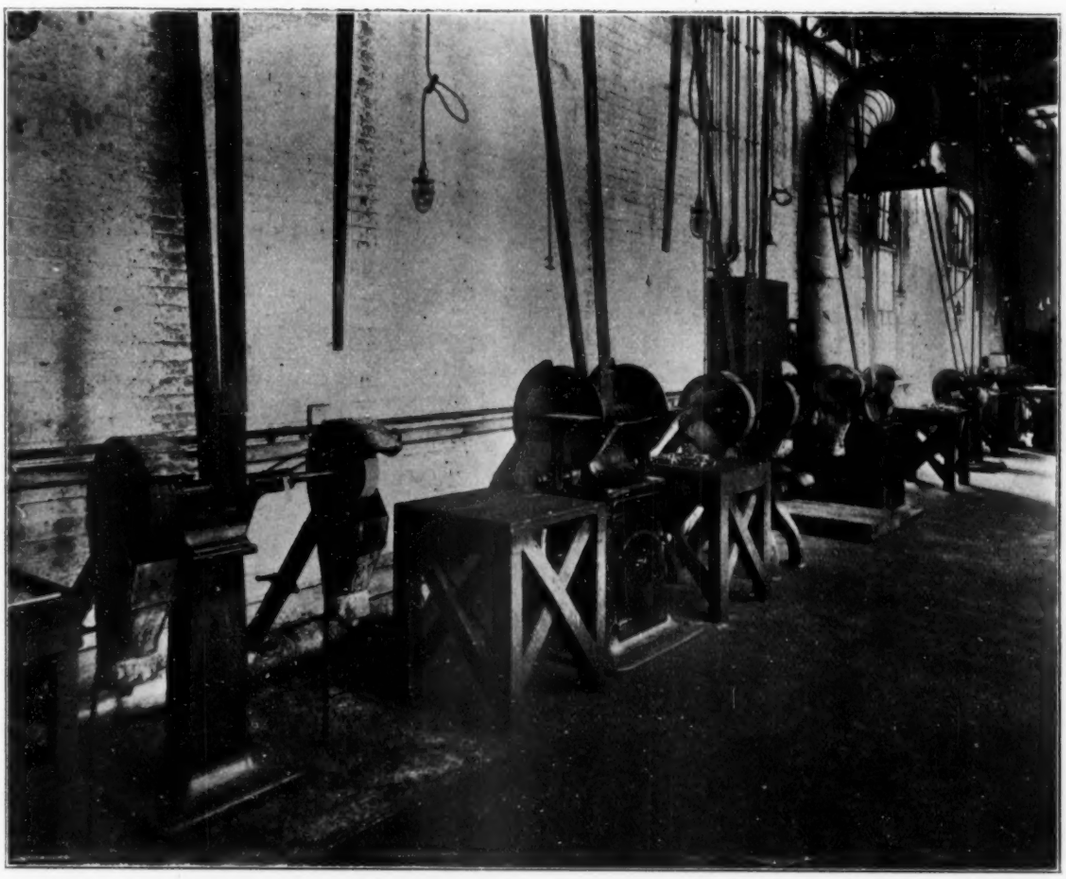


FIG. 1. INTERIOR OF A POLISHING ROOM.

Ventilation as ordinarily defined is understood to mean the maintenance within a closed apartment of a suitable standard of atmospheric purity. The effect of respiration of a single individual is to pollute beyond proper use at least thirty cubic feet of air per minute. This amount must therefore be removed and a similar amount admitted to maintain the same standard of purity.

In an ordinary dwelling house where the occupants are relatively few and the cubic space per occupant is large, the walls porous, and the leaks around windows numerous, the necessary air change usually results through natural means. In a crowded hall, however, where the per capita space is reduced to the minimum, vitiation proceeds so rapidly that extensive means are necessary for introducing fresh and removing the foul air, or at least allowing it to escape. In the shop we find a condition midway between the house and the hall. As a rule the atmosphere is not excessively polluted by respiration, but in many establishments a positive system of ventilation is essential to good health. Certainty of action can only be secured by the introduction of positive means. So-called natural ventilation is ineffective.

The fan blower is now universally recognized as the most economical device for moving large volumes of air under low resistances. As ordinarily introduced for shop heating it is installed in connection with a steel-pipe heater through which steam is circulated and across which air is drawn by the fan and forced to the various parts of the building. Only one-third to one-fifth of the heating surface is thus required that is necessary in a building heated by direct radiation. All of the surface is massed in connection with the heater, the danger of freezing and consequent leakage is entirely eliminated, and positive control is had over the temperature and volume of air supply.

In a new brick building the distributing system can often be so arranged that there is practically no evidence of its existence, the air being carried in underground ducts or in wall flues. In an old or wooden building galvanized iron distributing ducts are usually carried overhead and the air discharged toward the outer walls. In a general way such a system improves the conditions even while there is vitiation from sources other than

respiration, but specific vitiation usually requires specific ventilation which must be secured through the exhaust system. When a forced system of heating and ventilation is employed, creating a light pressure within the building, direct ventilation shafts may be provided from the places of vitiation provided the pollution is not serious. Otherwise it becomes absolutely necessary to introduce an exhaust fan in connection with a system of piping and hoods so arranged as to allow the minimum escape of gas, dust and the like to the room in which the apparatus is installed.

In the brass foundry a hot blast heating system will meet the ordinary conditions if the room is high and of generous proportions. By this means cool, fresh air can be forced in during the hot summer days. Natural draft hoods with sufficiently tall stacks may be introduced over the brass furnaces, but further ventilation can only be secured with certainty by the introduction of an exhaust fan. This should properly be of the cased or enclosed centrifugal type; the disc or propeller type being only suitable for operating against slight resistances.

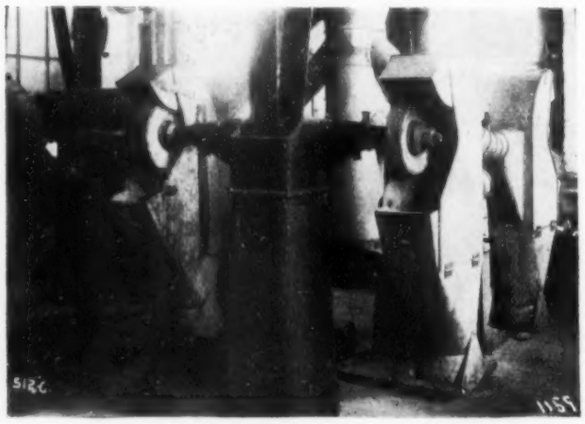


FIG. 2. TYPE OF HOOD.

Rattling and tumbling barrels may be rendered innocuous by exhausting through hollow trunnions or from housings built over the tumblers. An exhaust system in connection with the sand blasting room will greatly improve the conditions under which the workman operates.

Probably the greatest need of exhaust ventilation in the metal industry exists in connection with buffing, grinding and polishing processes. The high speed of rotation of the wheel tends to throw the fine particles of dust or lint directly into the atmosphere which soon becomes surcharged therewith. The accompanying illustrations serve to show typical installations of apparatus in such rooms. In Figure No. 1 is presented the interior of the polishing room in the new plant of the B. F. Sturtevant Co., at Hyde Park, Mass. Here is done the ordinary work found in the average machinery manufactory, namely the polishing and buffing of the brass and iron details of the machines. Each wheel is enclosed in an individual hood rigidly supported and connecting through an exhaust pipe to a horizontal main laid at the junction of the wall and floor just behind the grinders. Each connection is provided with a blast gate. A vertical connection enters the fan.

The type of hood shown in the foreground, which is much more clearly shown in Figure 2, is such that the fine particles thrown off tangentially from the wheel are caught in a pocket beneath, whence they may be removed at leisure. The vacuum produced within the case by the connection of the pipe near the level of the shaft tends only to draw away the very fine and light particles, thus materially reducing the wear upon the pipe and the tendency to clog the same. One fan exhausts from twenty-two buffing wheels and the other from eighteen grinding wheels. The majority of these wheels are 18 inches in diameter. In the detail is shown the construction of the hood, which is still better presented in Figure 2. The general arrangement of dust collectors upon the roof is also clearly shown in Figure 3. The system of exhaust piping is arranged for a 4-inch connection to each hood and for a gradually increasing diameter of the main pipe as it approaches the fan. By means of this exhausting system the atmosphere is kept clear, the room free from dust and the operatives in a healthy condition.

The fan speed required for an exhausting system depends largely upon the material to be removed. When properly applied a vacuum of from one to one and a half ounces is sufficient with a proper system of hooding to handle all dust in installations such as are here presented. If, however, the wheels are not properly hooded or the system not properly laid out, even a four ounce vacuum may hardly prove sufficient to give satisfactory results.

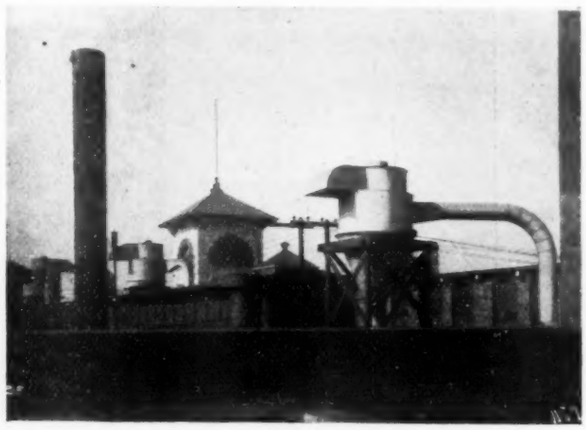


FIG. 3. DUST COLLECTORS UPON THE ROOF.

Hence it behooves one to accept the advice of those experienced in this class of work. When it is known that the power of a fan increases as the cube of the speed it becomes evident that a slight saving in the cost of the initial installation may be quickly absorbed in the added expense to operate the fan at unnecessarily high pressure. A fan at four ounce speed will require eight times the power necessary to operate it at one ounce speed. In numerous instances existing installations have been remodeled, larger fans installed, new hoods introduced and such a marked saving made in the running expense as to pay for the new installation inside of a year.

The architect of the New York Custom House has secured an extra appropriation from Congress by means of which much of the hardware of the building will be brass instead of iron.

A considerable quantity of zinc is consumed in the manufacturing trades in the form of zinc dust which is a by-product obtained in the production of zinc. Upwards of 50 per cent. of the consumption of spelter in the United States is stated to be used for the galvanizing of iron.

For Britannia and tin casting alloys, magnesium can also be recommended as an excellent deoxydizer. It answers very well to use the magnesium in the form of magnesium-tin.

TESTS MADE ON SOLDERS FOR STEEL BRAZING.

The following tests on brazing solders for steel pipe were recently carried out at the British National Physical Laboratory. Difficulty had been experienced in the brazing of steel joints and samples of the solder, the steels and the borax used were sent to the laboratory for testing. Chemical analyses showed that there was nothing abnormal in the composition of the steels, and that the borax was of remarkable purity. The analysis of the solder was as follows:

	Per cent.
Copper	52.53
Zinc	45.46
Lead	1.35
Iron	0.42
	99.76

Five samples of commercial steel-brazing solders were then procured, and the following tests were carried out:

1. The brazing qualities were tested, both as regards iron and steel, by heating being performed in an ordinary smith's hearth. Attention was paid to the three leading particulars of temperature, ease of flushing, and tenacity. The last-named quality was tested by breaking the brazed joint with a hammer.

2. Two series of brazed joints of good quality mild steel (0.3 to 0.35 carbon) were made in the factory of the Birmingham Small-Arms Company, Limited, the brazing being done with blow-pipe and gas. One series of joints was tested at the works by breaking them with a hammer; the other series was broken by tension in the testing-machine at the National Physical Laboratory.

3. Complete analyses of the solders were made in the chemical department of the laboratory. The results are tabulated in the two accompanying tables.

Although five solders have been under examination, the chemical analyses show that the compositions of Nos. 2, 3 and 4 are so similar that it must be admitted that only three types have been tested. This fact is brought into prominence in the table. Solders Nos. 1 and 5 occupy the same positions in each test, the former at the top of the scale, the latter at the bottom of the scale; whereas Nos. 2, 3 and 4 vary their relative positions somewhat.

The National Physical Laboratory tests are the only ones for which a numerical value of the tenacity of each brazed joint can be given, and these do not permit of a distinction being drawn between Nos. 1 and 3.

Work's Test.	National Physical Laboratory Tests.
Order of satisfactoriness as judged by the hammer test.	Number of solder.	Tons (avordupois) to produce fracture per square inch of brazed surface.
Number 1.....	1*	4.26
" 2.....	3*	4.19
" 4.....	2†	4.13
" 3.....	4†	3.94
" 5.....	5†	3.30

No. of solder.	Behavior on fusion.	Working Tests. Tests on steel.‡ Flushing.	Tenacity.	Tests on iron.§ Flushing.	Tenacity.
1.	Fairly high melting range (highest of series)	Good.	Good.	Good.	Good.
2.	Moderately high melting range.....	Good.	Good.	Good.	Good.
3.	Moderately high melting range.....	"	"	"	"
4.	Low melting range.	"	Fair.	"	"
5.	Low melting range.	"	Bad.	"	"

*In these two cases fracture took place across the test piece, at the end of the brazed joint. †In these three cases the brazed joint was stripped from end to end.

‡The steel was placed inside the fire. §Heating was performed on the top of an open fire.

The chemical analysis of the solders gave the following results:

Number of solder.	Copper. per cent.	Zinc. per cent.	Lead. per cent.	Tin. per cent.	Total. per cent.
1.	63.19	36.31	0.65	Absent	100.15
2.	51.83	47.71	0.69	Trace	100.23
3.	51.54	47.48	0.84	"	99.86
4.	51.39	47.87	0.86	"	100.12
5.	49.76	49.16	0.98	"	99.90

No. 5 is markedly worse than any of the other joints.

No metal, even in traces, other than those given in the table of chemical tests, was found in the solders.

The following conclusions are drawn from the tests:

1. The higher the copper content is, the better is the solder.

2. Solders 1, 2 and 3 are satisfactory.

3. Solders 4 and 5, and especially the latter, are unsatisfactory, both because they fuse at too low a temperature and do not give a strong joint with steel. There is no obvious reason why solder No. 4 should not be as good as Nos. 2 and 3.

Comparing the chemical composition of the solder mentioned in the beginning with those of Nos. 1 to 5, it will be seen that the copper content is sufficient to permit of the solder being satisfactory for iron and steel brazing, but that the percentage of lead is considerably higher than that of No. 5, the highest of the series, and that there is a notable amount of iron.

The presence of lead in solder will certainly lower the temperature of the range of fusion, and this fact will tend to make it less satisfactory.

The iron, which has probably been introduced by stirring the molten solder in manufacture with iron rods, and which was present, at any rate partly in the form of dirt, will certainly have a detrimental influence, for it will hinder the solder from flushing completely, and it will prevent the formation of a clean joint.

The influence of lead and iron in solders of this type, as regards their application to steel brazing, seems to be a suitable subject for further research.

The following comments on the above subject were given by a correspondent of "Engineering": The percentage of lead in a good brazing solder should not exceed 0.4 per cent. For making brazing solder, spelter containing about 99.5 per cent. zinc, and best select or electrolytic copper should be used.

The test solders Nos. 1, 2, 3, 4 and 5 have evidently been made of spelter containing 1½ or 2 per cent. of lead. The percentage of iron in the solder quoted at the head of the paper has more probably been introduced by the solder being pounded in an iron mortar, as is usual in some works, than through stirring the molten metal with iron rods—that is, of course, assuming the solder to have been sent to the National Physical Laboratory in powder, and not as an ingot.

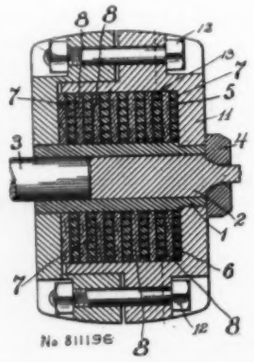
If the test solders Nos. 2, 3, 4 and 5 had been made of the purest commercial metals, so as to have contained not more than 0.3 per cent. lead, they would have given as good practical and tensile tests as No. 1.

It is interesting to note in connection with this subject

that a brass flange containing 2 per cent. lead will not braze satisfactorily, and brass-brazing solder containing equal parts of copper and zinc, if it contains 1 per cent. lead, does not give a satisfactory joint. The lead appears to separate out and weaken the metal.

THE EXTRUSION PROCESS OF MANUFACTURING METAL SHAPES.

The extrusion process for manufacturing all kinds of solid or hollow shapes, such as wire rods, bars and the like, is used to a considerable extent. The most important feature of the apparatus used for extruding metal is the extrusion cylinder or pressure chamber which holds the body of the metal which is being acted upon by an hydraulic or other piston. A special construction for such a cylinder has recently been patented by G. H. Benjamin, of New York, with U. S. patent No. 811,196, of January 30, 1906, and assigned to the Coe Brass Manufacturing Company.



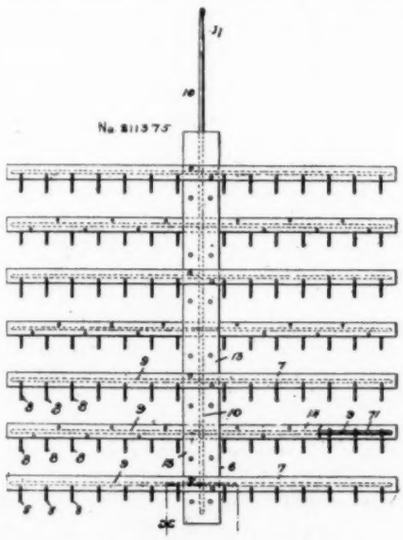
THE CONTAINING VESSEL.

The containing vessel is shown in the accompanying illustration. It consists of a cylinder 1, which is open at the end and forms the chamber 2 for receiving the metal which is to be extruded. A sufficient quantity of the metal is placed into the chamber 2 for forming the desired metallic shape and pressure is applied by the piston 3. The cylinder is strengthened by being wrapped with wire 5, which is preferably flat and covered with asbestos or other non-heat connecting material 6. The wire is preferably arranged in the form of coils 7, 7, which are separated by rings 8 of asbestos and are kept in position by the latter.

In order to hold the winding in position and to further strengthen the cylinder, an outer jacket 11 of cast steel is employed, which is made in sections held together by bolts 12. The object of this construction is to retain the heat in the body of metal under pressure and to prevent the sides of the cylinder from bulging out.

RACK FOR PLATING AND DIPPING.

A U. S. patent recently issued to J. P. Clark, of Newark, N. J., with No. 811,375, of January 30, 1906, has reference to a plating and dipping rack. The construction is shown in the accompanying illustration. The rack has a center piece 6 to which are secured a number of transverse bars 7. The bars are preferably of wood or other non-conducting material. The transverse bars carry a series of metallic hooks 8, from which the articles that are to be plated are suspended. Each hook of a series is connected to a transverse wire 9, which is in turn connected with a vertical wire 10. The latter has a hook 11 at its upper end for the support of the rack. The wires 9 and 10

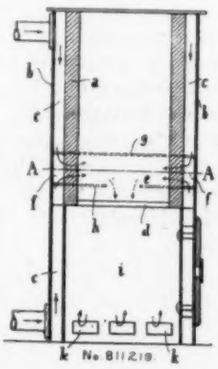


PLATING AND DIPPING RACK.

are covered by plates 13 of wood, so that they do not receive a deposit of metal. The hooks are arranged on one bar to project in an opposite direction from that of the hooks on the next bar.

NEW CRUCIBLE FURNACE.

The accompanying illustration shows a crucible furnace which has been patented by E. Hausmann, of Cologne, Germany, on January 30, 1906, with U. S. patent 811,219. The object of the invention is to so conduct the air which is used under the grate that it is heated as uniformly as possible. The crucible furnace consists of a square shaft of masonry a, surrounded by a sheet metal casing b.



THE CRUCIBLE FURNACE.

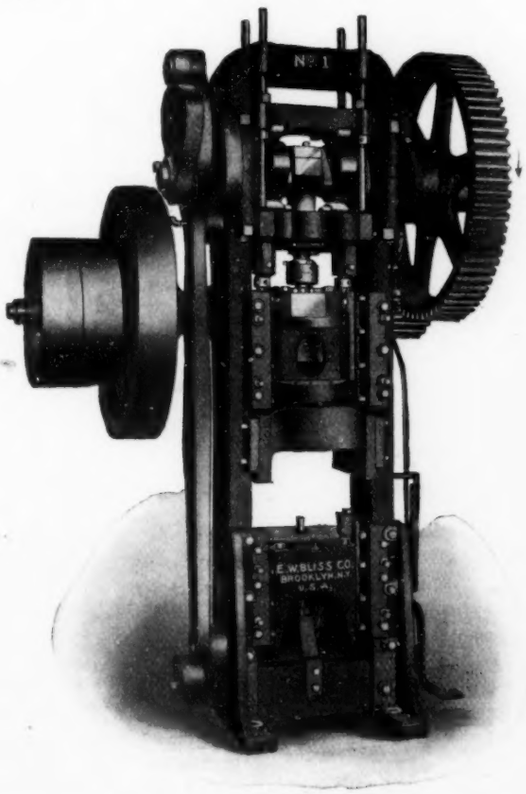
Between the shaft and the casing there are left passages for the air supply, the air entering by a pipe at the top of the furnace. Another stream of air enters at the very bottom of the furnace. The two streams are conducted into the hottest zone A, which lies a short distance above the grate d of the furnace. They then flow downward in other air passages and pass through apertures k in the walls of the ashpit into the space beneath the grate d and then through the grate into the fire.

INDUSTRIAL

NEW AND USEFUL DEVICES, APPLIANCES AND SUPPLIES OF INTEREST TO THE METAL TRADES.

THE NEW TRIPLE ACTION DRAWING PRESS.

It has been truly said that this is the age of invention; and in no other field has there been greater progress than in the line of machinery for making sheet metal goods. First there was the plain single action press, and later the toggle press. The development of this machine has now led to the triple action drawing press, an illustration of which is shown in the accompanying half-tone. This type of press is presented to press users as especially useful and economical for drawing deep seamless shells. In addition to the plunger, this press has two slides, each of which has an independent well, thus permitting of making in one operation work which has hitherto required two operations.



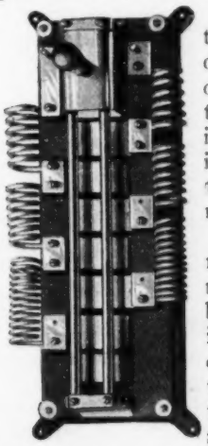
TRIPLE ACTION DRAWING PRESS.

This method does away entirely with annealing the first operation shells, inasmuch as the second operation immediately follows the first, making the second draw while the metal is still warm from the first operation. The future alone will decide the possibilities of this type of press, but it is interesting to know that a tin shell, 3 inches diameter by 3 inches deep, has already been successfully made at one stroke of the press. The press shown will receive a blank 11 inches in diameter and a drawing punch up to 6 inches in diameter. It will draw in depth and lift out up to 3 inches. The total weight of the machine is 8,000 lbs. The press is of very compact construction and occupies no more room than any double action press of the corresponding size for the second operation shell. The press may be set in an inclined position allowing the finished shell to fall off by gravity. It is built by the E. W. Bliss Company, 23 Adams street, Brooklyn, N. Y.

NEW TANK RHEOSTAT.

Tank regulation in a plating plant, where different solutions are in use, is a matter of the utmost importance. There is a material difference in the density of different solutions, which varies also as they are used, and in manipulating tanks of different size, where different solutions are employed, it becomes not only essential but necessary that some regulation should be secured. The field rheostat on the dynamo affects the voltage at the terminals of the machine by increasing and decreasing the resistance. On the other hand, a rheostat placed in series with the tank affects both amperes and volts, reducing the latter in the proportion in which the former is cut down.

The size of the rheostat selected for any given tank should be properly proportioned to the ampere capacity of the tank. This condition makes it practically necessary that each tank be provided with an independent rheostat of the proper ampere capacity.



The "Leader" Rheostat shown in the accompanying cut is of a new design. The contacts are mounted on a rectangular slate base, which in turn is mounted on an iron supporting frame provided with feet, so that it can be fastened to the wall or on the side of the tank at any convenient location.

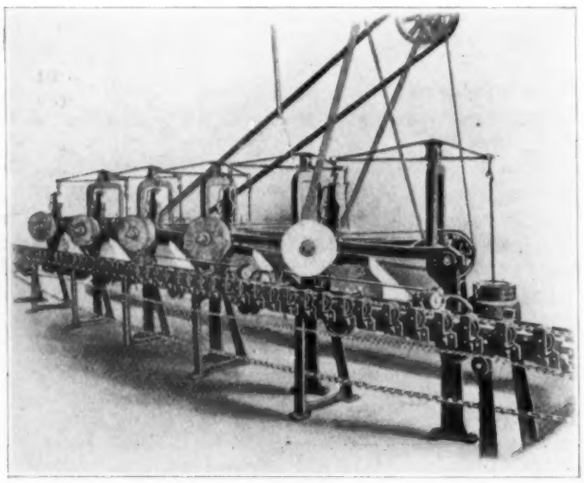
The brass segments to which the resistance units are connected are mounted lengthwise on the slate base, with the terminal ends reversing first on one side and then on the other, so that in moving the connector block over these contact surfaces the connectors are short circuited and the resistance cut in as the block slides forward or backward. This short circuiting block, which carries a suitable manipulating handle, operates on parallel bars, supported by heavy brass pedestals or posts mounted on the rectangular ends of the slate. This block is cast hollow and carries a brass contact shoe which is actuated by springs placed inside the hollow box, and which insure perfect contact on the segments.

The rheostat is manufactured by the Dow Chemical Manufacturing Company, of Mansfield, O., in seven sizes, for a capacity of from 55 to 900 amperes.

Gold-copper alloys tarnish when exposed to air owing to the oxidation of the copper and blacken on heating in the air from the same cause. This oxidized coating may be removed and the color of fine gold produced by plunging the metal into dilute acids or alkaline solutions, which operation is technically known as "blanching."

AUTOMATIC TUBE POLISHING MACHINE.

THE METAL INDUSTRY has received a number of inquiries for builders of automatic polishing machinery, particularly a machine which automatically polishes tubing. The accompanying cut shows in operation a five-wheel automatic tube polishing machine. With five wheels the machine has a capacity of 2,500 feet per day and can be adapted to work of any diameter and from two inches to eight feet in length. Every inch of surface is said to be polished as the tube revolves in its holders and is at the same time mounted



AUTOMATIC TUBE POLISHING MACHINE.

in a horizontal direction, passing beneath all of the wheels of the machine at an angle of 30 degrees, the same as with hand work. It can be operated by belt or other transmission or direct connection and the speed of the carriage is easily regulated. It is made in a variety of sizes from two wheels to six wheels and is manufactured by the Robinson Automatic Machine Company, Detroit, Mich., who also build an automatic machine for the polishing of flat surfaces. All of the machines are claimed to be absolutely automatic, after the start one man operating with ease.

NEW PARTING COMPOUND.

A parting compound which is stated to possess the same good qualities as lycopodium powder, but to be much cheaper, has been patented by E. Bruehl, of Berlin, Germany, with patent No. 811,477, of January 30, 1906. The powder is made as follows: A porous material such as silicious marl is mixed with a resin such as sandarac and then gradually heated to a temperature of from 300 to 560 degrees F. The resin is absorbed by the mixture and the mass gradually becomes of a doughy consistency.

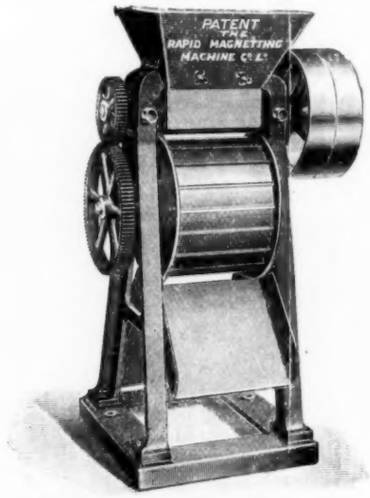
By being thus heated with a porous material the resin is stated to undergo a change which makes it harder and more brittle after it gets cold. It also loses its adhesiveness. It loses in this operation from 10 to 20 per cent. of its weight. As a rule up to 20 per cent. of the resin may be taken when silicious marl is used and up to 50 per cent. when charcoal is used as the porous material.

The caked substance obtained by the process is reduced to powder by any suitable means. It is stated that the powder may be ground as finely as desired and that it will not clog or stick to the pestle or mortar as resin would do. When charcoal is used for making the powder the latter is dark in color and will burn away entirely. Silicious marl will leave a residue of silica which does not soil the mold.

ELECTRO MAGNETIC SEPARATOR.

The accompanying illustration represents the standard type of a British construction of magnetic separators which is known as the "Rapid." The manufacturers mention the following among its chief features. The material is automatically fed in a constant stream onto the revolving brass drum, after having been introduced into the hopper to which is attached a patented vibrating plate and a feed regulator adjustable for any size of material.

Inside of the brass drum, radiating from the center, there are fixed the electro-magnets and the magnetic field extends around one half of the drum. On coming into contact the iron is held by the magnets and by means of the ridges on the revolving drum is carried around to the back of the machine and out of the



ELECTRO-MAGNETIC SEPARATOR.

magnetic field. It then falls immediately by gravity. Whilst revolving, the iron jumps from magnet to magnet, thus releasing the non-magnetic material. The machine is not confined to one class of material inasmuch as it will do small scraps as well as turnings, that is, scraps of ¼ to ½ pounds in weight.

Another type of machine is made with powerful raw magnets specially designed for treating heavy material, such as brass washings, from casters' ashes skimmings, scraps, large punchings, etc. The machines are manufactured by the Rapid Magnetting Machine Co., Ltd., Birmingham.

GERMAN SULPHURET OF POTASSIUM.

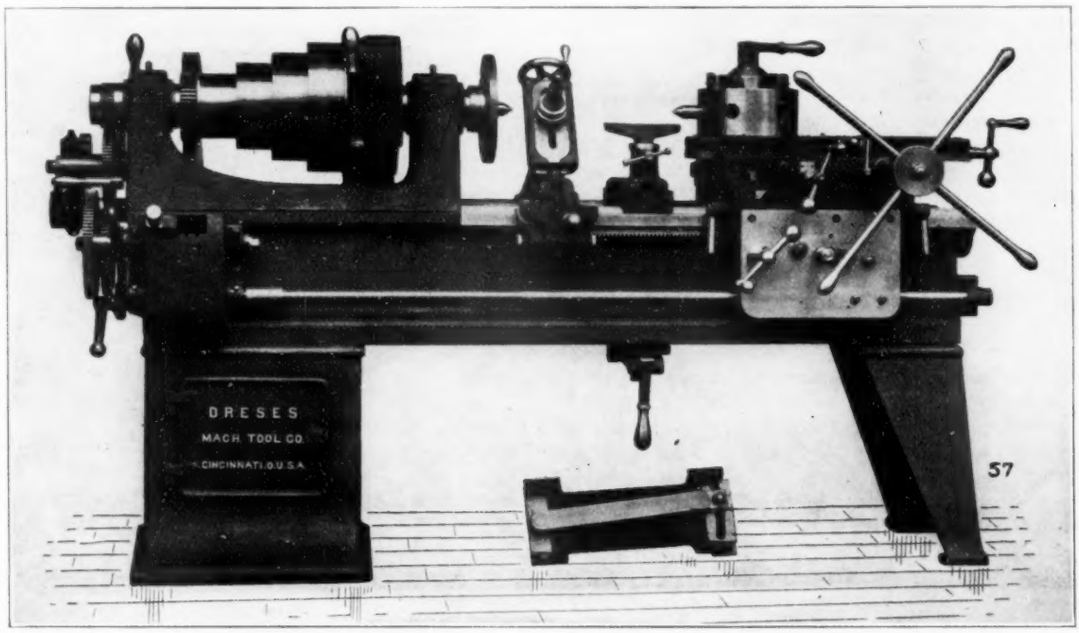
There is a very considerable amount of sulphuret of potassium now employed in the production of the various oxidized finishes on silver and copper. According to experiments made, the imported German sulphuret of potassium gives far better results than the domestic article, although it costs no more. It is much stronger and purer and consequently better results are obtained with a given quantity as it is more uniform and the deposits are more adhesive and of a denser color. Another advantage is that the imported sulphuret of potassium comes in flakes about ¼" thick, which is preferable to the lump form of the domestic article.

TWENTY-INCH FULL MONITOR LATHE.

A machine recently brought out for the use of brass manufacturers is the monitor lathe shown in the accompanying illustration.

This machine is designed for general brass and similar work of special and heavy character, and with the object to also manufacture without special tools, in a more economical way than is possible with an ordinary universal monitor lathe.

The turret carriage is provided with an automatic feed in the regular engine lathe manner placed in an apron in front of the machine. The four coarsest feeds are 8, 11½, 14 and 18 to an inch conforming with the standard pipe threads. This arrangement not only avoids stripping of threads in large tapping, but also in and outside, straight and taper threading can be done by a turret tool without a tap or die. There are twelve changes of feed multiples by 3 and 6 of the four coarsest. Four changes of feed can be made instantly by a handle located below the headstock, and the reverse is made by a knob in front of the apron.



NEWLY DESIGNED MONITOR LATHE.

The turret is provided with a set-over and taper attachment. The latter is shown below the bed and can be used in connection with the power feed for taper turning, boring and threading. It slides between the V's of the bed and can be clamped in any position and removed when not used. The turret carrying slide is provided with pilot wheel and screw movement. The turret revolves on a stem with adjustment for wear, and the locking pin withdraws at the return movement of the top slide, making it semi-automatic.

The machine has also the well-known chasing bar and the follower holder is yielding for taper work. Right and left hand threads can be cut without changing the leader. The headstock is friction back geared and has a four-step cone with special large belt contact. The spindle has a 1 13-16-inch hole, and a wire feed can be easily applied. The cabinet support under the head is provided with tool shelves and the tail end leg is attached in a hinged manner to form a three point support.

The machine weighs about 2,900 pounds, and is made by Dreses Machine Tool Company, Cincinnati, Ohio.

WOVEN WIRE ACID DIPPING BASKETS AND THEIR USE.

By Chas. H. Proctor.

Woven wire acid dipping baskets made from steel, copper or aluminum wire are rapidly taking the place of those made from earthenware or other substances. In the production of many small articles made from copper, bronze and brass recourse must be had to potash solutions and to various dipping acid solutions in order to produce the bright finish desired upon these goods. It is interesting to note in this branch of the industry that metallic dipping baskets are rapidly superseding the old style. The reason for this is that such baskets are not liable to get broken and that they do not absorb the acids.

In using these metallic baskets the operator must employ some discretion in regard to the purpose for which they are to be used. For instance steel or iron baskets may be used in all alkaline solutions of potash or soda salts, but acids would attack them very rapidly. Baskets of copper may be used in the same manner. Again aluminum is very rapidly attacked in caustic or other soda solutions and in muriatic, hydrochloric or hydrofluoric acid. On the other hand, concentrated nitric acid, commercial aqua fortis or sulphuric acid, or mixtures of these acids have no perceptible action on aluminum but will remove the oxide of the metal very readily as may be seen in the production of dipped aluminum. It is therefore advantageous to use baskets of iron, steel or copper for potash or soda solutions, and aluminum for dipping and pickling. The baskets are made commercially in various shapes and are of a mesh varying in size for very small articles up to large ones.

Copper is unchanged in dry air at ordinary temperatures. In damp air, however, and in the presence of carbonic acid it becomes coated with a film of basic carbonate of copper, the so-called verdigris. When it is heated to redness in the air it becomes covered with a grayish black layer of cupric and cuprous oxides, the so-called copper scale.

CORRESPONDENCE

IN THIS DEPARTMENT WE WILL ANSWER ANY QUESTION RELATING TO THE NON-FERROUS METALS AND ALLOYS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

METALLURGICAL.

Q.—What is the best dressing for the cast iron molds in which slabs are cast for sheet rolling?

A.—A mixture of 3 parts common rosin and 1 part of lard oil melted by heat to the consistency of molasses may be used. It is applied to the molds with a stiff brush.

Q.—What are considered to be the best lubricants or wire-drawing solutions for drawing brass wire and copper wire both say from 12 to 20 gauge?

A.—One pint of lard oil or one pound of common whale oil soap and one ounce of washing soda boiled with one gallon of water makes a satisfactory solution for both metals.

Q.—What drawing plate is generally employed in wire drawing, soft steel, hard steel or chilled cast iron?

A.—Chilled cast iron for the larger sizes say up to 12 gauge and medium hard steel for the sizes of above this gauge.

Q.—You would greatly oblige me if you would send me a receipt for an easy runing brass solder which can be rolled out and used in strips.

A.—The following composition for a brass solder should prove satisfactory for the purpose mentioned: Copper 54½ parts, zinc 43½ parts, tin 1½ parts and lead ½ part. An easily flowing hard solder may be made from 34 parts of copper and 66 parts of zinc, but its color is white.

Q.—Please advise me of a good mixture for white metal patterns.

A.—The best white metal mixture for patterns consists of 69 parts of lead, 15½ parts of antimony and 15½ parts of bismuth by weight. This mixture is claimed to be non-shrinkable. A cheaper mixture which gives good results may be made up from zinc 10 parts, antimony 1 part and tin 1 part.

Q.—Kindly inform me of a cheap method of stripping nickel from platers' baskets and hooks on a large scale, say 10,000 pounds at a time, and also of a cheap method for operation on a small scale.

A.—The only mechanical method we are aware of consists in the use of iron tumbling barrels. The scrap is placed in the barrel and iron balls are used of the shape of the old-fashioned cannon balls. The deposit is then simply pounded off by the motion of the barrel. This is the only way in which the removal can be accomplished.

PLATING AND FINISHING.

Q.—We are sending you a sample of a bronze finish; kindly advise us how the bath is prepared to secure this color. Is it possible to take it from the bath and finish with the brass scratchbrush? If necessary to buff, what is the process of cleaning after buffing ready for lacquering? Please state the complete process.

A.—A solution for producing the bronze finish, as per sample submitted, should consist of carbonate of copper 4 ounces, carbonate of zinc 1 ounce, carbonate of soda 2 ounces, C. P. cyanide of potassium 8 ounces, water 1 gallon. It should be made up in the usual manner as for brass and copper solutions. Low brass anodes should be used in connection with bronze solutions. No zinc should be added after the solution is once in a working condition, unless such addition is absolutely necessary. Ammonia added occasionally will maintain the color. The solution should be used at about 100 degrees. Another good solution which will give good results for bronze finish will be found on page 11 of the January, 1906, issue of THE METAL INDUSTRY. The quickest method of producing the finish is to pass the goods through a slow acting bright dip as quickly as possible. In some cases if the deposit is all right the finish will be bright enough. If it is not, it is colored on a soft buff using a white polishing compound, if the wheels are kept clean. The articles may be passed through the lacquer thinner first and then directly into the usual lacquer bath. They should be dried in the usual manner.

Q.—Can you give me a recipe for a lacquer which is used for tinting rose finish work? It should give a nice pink red appearance to the background, which should have no gloss. It should also be durable, as it is used on gold link buttons.

A.—The usual transparent collodion lacquer such as is used in lacquering ormolu gold plated white metal goods should answer your purpose. This can be purchased from several of the manufacturers of lacquer and is sold for this particular purpose. It does not produce lustre and is harder than the metal itself. The formula for making it consists of 6 ounces of gun cotton, which is dissolved in one gallon of amyl acetate with frequent stirring and agitation until the solution is complete. The thinner consists of 1 part of fusel oil and 2 parts amyl acetate added when necessary.

Q.—Will you please give me a receipt for a royal copper finish on silver?

A.—It is impossible to produce a royal copper finish direct on silver without first depositing a heavy coat of copper on the articles. See answer to correspondence on page 249 of the December, 1905, issue of THE METAL INDUSTRY for method of procedure for this finish.

Q.—Kindly let me know the best acid mixture to use in the tub for cleaning brass.

A.—A bright dipping acid will probably answer your purpose best for cleaning brass. A good formula consists of the following proportions: Pale aqua fortis 38 per cent. one gallon, oil of vitriol 66 per cent. one gallon, water ½ gallon and rock salt 8 ounces. In mixing, the vitriol should be added to the aqua fortis and not vice versa. The water and the salt should then be added. When replenishing the bath no water should be added, but only equal parts of vitriol and aqua fortis.

Q.—Can you inform us of a good oxydizing solution for nickel? We are having considerable call for this finish for iron and steel and have so far not found a formula which is quite satisfactory.

A.—As nickel is a non-oxydizable metal it will be necessary for you to produce a slight electro-deposit on the nickel surface. A solution may be made up for this purpose by dissolving 5½ oz. single sulphate of nickel and 3½ oz. sal ammoniac in 2 gallons of warm water. After dissolving add 2 oz. sulphocyanide of potash. This addition causes the solution to take on an olive green color. Ammonia is now carefully added until the solution has the color of the natural nickel solution. This

solution is used slightly warmed, with nickel anodes and about the same amount of current as would be used for nickel plating.

Q.—Please inform us of a method of producing a statuary bronze finish on iron or steel after copper plating, or would you not advise copper as a basis at all?

A.—Barium sulphide in a proportion of ½ oz. to each gallon of water, used slightly warm, makes a very satisfactory bronze finish. Scratch-brushing is necessary to produce lustre and color. An acid copper solution consisting of 20 oz. of commercial cyanide of copper and 4 oz. of commercial sulphuric acid to each gallon of water used makes a very satisfactory solution to use in connection with the oxidized colors. Soft copper sheets are used as anodes. After the usual copper plating in the cyanide bath the articles are washed and immersed for five minutes in the acid bath. This solution deposits very rapidly and as much copper can be deposited in five minutes as would require twenty minutes in the cyanide bath. After the acid bath the articles are washed well and immersed in a cold solution containing ¼ oz. of liver of sulphur to each gallon of water. This solution produces a brownish red tone on the copper. The articles are then removed, scratch-brushed with a wire machine brush and a little sal soda is added to the water which is used to moisten the brush. This method of operation produces a beautiful statuary bronze color with very little difficulty.

Q.—Will you kindly give me a process for obtaining an acid bronze finish on brass tubing for gas and electric work?

A.—You do not state what particular color you desire to produce. There are several acid bronze finishes and we presume you refer to the acid verde antique finish. In order to produce this finish the articles should be as clean as is required for plating. If a dead surface is to be produced the article should be immersed in the following solution, which is to be used slightly warm:

Blue vitriol	2¾	lbs.
Sal ammoniac	2	lbs.
Acetic acid	1	pint.
Vinegar	1	qt.
Rock salt	2½	lbs.
Water	4 to 5	gal.

A simple solution which consists of:

Blue vitriol	1½	lbs.
Sal ammoniac	1½	lbs.
Water	1	gal.

may also be used.

The work is allowed to remain in one or the other solution for a minute or more and is then removed and allowed to dry. The green color should then commence to show. After some time the articles should be given a second immersion. When partly dry a 2-inch stiff bristle painter's brush should be taken and the surface rapidly gone over with a stipple motion. This procedure distributes the color more evenly and gives it a more antique appearance. After drying the articles should be lacquered with a transparent gun cotton lacquer, and when thoroughly dry a soft lustre may be given them with a canton flannel cloth to which a small quantity of beeswax has been added. The blue vitriol which is mentioned in the above formula is the commercial sulphate of copper.

Q.—Please let me know as soon as possible the best formula of a copper solution for plating large and heavy pieces of gray cast iron. I should also like to know a good formula for an acid copper solution and the voltage I would have to use in order to obtain a fine copper deposit on gray cast iron work plated in a cyanide of copper solution.

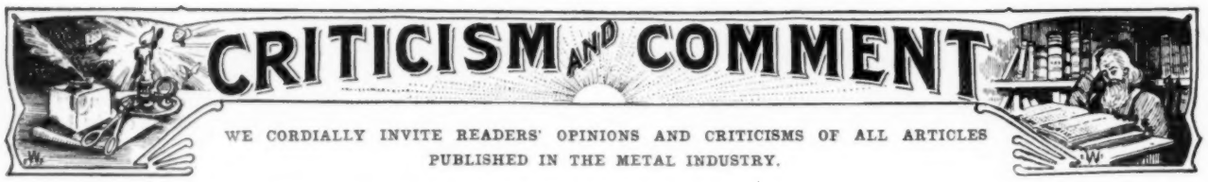
A.—A good copper solution for the purpose mentioned was given in the January, 1906, issue of THE METAL INDUSTRY. The voltage that is necessary is from 4 to 6 volts. An acid copper solution to give good results should contain 16 ounces of commercial sulphate of copper to each gallon of water used, adding when the salt is dissolved, 4 ounces of commercial sulphuric acid. White gelatine to the amount of 3 or 4 ounces dissolved in warm water and added to a 100-gallon bath produces a smoother and denser deposit. This bath is especially recommended for heavy deposits of copper such as are necessary in producing antique copper effects.

Q.—We have tried the solution for mahogany finish, following closely the formula given by you, but it does not produce a rich enough red, the red in mahogany being different from a copper red. Please give us some suggestions which may help to obtain the desired results.

A.—For the production of the red mahogany the following method of procedure should be followed: A good smooth surface should be produced which should be equal to the usual cut down finish applied to brass. The articles are cleaned in the usual manner and are then copper plated for a few minutes, preference being given to the acid copper solution. The articles are removed, washed and scratchbrushed with a fine wire brush, using a little sal soda in the moistening water. A cold solution consisting of ⅛ ounce of hydrosulphuret of ammonia and ⅛ ounce sulphuret of potash in one gallon of water should be used. The scratchbrushed articles should be passed through the copper solution and then again through the potash and cyanide bath. They should then be washed and immersed in the coloring solution, first for a few seconds. The articles should then be removed, washed and brushed wet as before. They should then be washed and immersed a second time in the coloring solution and washed and brushed as before. The color should then be of sufficient depth. The articles should be removed, washed, dried and lacquered with a lacquer which consists of the following proportions: Amyl acetate collodion 6 ounces to the gallon one part, wood alcohol French varnish one part and equal parts of a mixture of amyl acetate and fusel oil two parts. This produces a good dense lacquer. However, any part collodion and part varnish lacquer will answer. Until the operator is sufficiently proficient to produce the finish a third application will probably be necessary in the coloring solution. It can be produced with one application by increasing the strength of the solution after sufficient experience has been gained.

Q.—I should like to make a new nickel solution, and as I want the latest and best I ask you for the information. I want a solution which will give good heavy and white deposits on all kinds of work, as it is to be used for job work?

A.—A recipe for a 50-gallon nickel plating solution was given in the Correspondence Department in the December, 1905, issue of THE METAL INDUSTRY on page 248. This bath gives very good results, is easily made and can be used on all kinds of work. After the solution has been used some time or when the solution needs building up the method may be used which has been described by Mr. Charles H. Proctor in an article entitled "Replenishing the Nickel Bath," and published in the May, 1905, issue of THE METAL INDUSTRY. The method given in that article is one of the best for renewing nickel solutions.



THE NEW COPPER COMPOUND.

To the Editor of THE METAL INDUSTRY:

I note in my article entitled "A New Copper Compound for Copper Baths and Bronze Baths," published in the January, 1906, issue of THE METAL INDUSTRY, the following typographical error: In the paragraph entitled brass bath mention is made of the use of arsenic for obtaining bright deposits when necessary. The statement reads that 2 ounces and 3 grains of arsenic should be added to each gallon of solution used. Of course, any plater with any knowledge of brass baths would know that this was an error or oversight in the figures of proportion. The statement should read correctly: "Two or three grains of arsenic, dissolved in twice the amount of caustic soda and added to each gallon of solution used when brighter deposits are desired."

I wish again to call the attention of the readers of THE METAL INDUSTRY to the new copper compound which I described in the January issue and to the fact that the commercial suboxide of copper does not give satisfactory results owing to its impurities. The German imported article can be purchased at half the cost of the domestic article.

CHAS. H. PROCTOR.

THE COLORING OF SILVER.

In the article by Mr. Edward E. Newton under the above title in the February issue of THE METAL INDUSTRY a typographical error made the solution of platinum chloride used appear to be 25 per cent., while in reality it should be 5 per cent. In the same article it was stated that for making up aqua regia one *pint* of nitric acid was to be taken to three parts of muriatic acid. It should have read "1 *part* of nitric acid to three parts muriatic acid," as every one who is familiar with the making up of aqua regia will doubtless have been aware of.

To the Editor of THE METAL INDUSTRY:

I have a scrap book that I devote to clippings from technical papers and a number of times when looking over THE METAL INDUSTRY I have found so much that I really wanted to save, for it was matter that was liable to be of use to me at any time, that the clipping consisted of nearly the whole number.

R. H. PALMER.

The following uncommon metallic impurities are stated to have been found in metallic zinc: silver, 0.0017 per cent. in spelter from Upper Silesia; thallium, 1.40 per cent. in a specimen smelted from scrap; indium, 0.0524 per cent. in spelter from Freiberg, Saxony; magnesium, 0.46 per cent.; aluminum, 0.17 per cent.; antimony, 0.0249 per cent. in zinc from Missouri.

A percentage of lead as high as 1.5 is stated to permit the rolling of the zinc without cracking the sheets, and even zinc with 3 per cent. lead may still be rolled, but it is very weak. The weakness and softness of the sheets increase as the percentage of lead increases.

THE USE OF ALUMINUM FOR DIES, FORCES, ETC.

To the Editor of THE METAL INDUSTRY:

Regarding an inquiry which the writer received concerning the use of aluminum in aluminum bronze prior to 1889 for dies, forces, etc., it may be of interest that the writer's first experience with the metal was about 1884. The wonderful stories told at that time regarding its great strength, lightness, etc., attracted much attention among metal workers. For instance, it was said that it was the coming metal to be used for ship building, bridges, and nearly all purposes that iron is used for. The price of aluminum at that time was $4 per pound and the writer has a piece on the shelf bought at that time and at that price. As the cost was so high it was prohibitory to its use to any great extent and but little was known among foundrymen of the good or bad qualities of the metal. At the present time with the price at 35 cents per pound the use of the metal for many purposes is practicable, but like many other good things a knowledge of its action is required to get the best results. There is a large quantity of the metal used in automobile work and anybody who attended the automobile show in Madison Square Garden in January of this year had a chance to see some of the castings, which were very fine in all respects.

H. O. WINSLOW.

To the Editor of THE METAL INDUSTRY:

I have seen at various times in THE METAL INDUSTRY that suggestions are always welcome. In the way of suggestions I will say that it is good to give malleable cast iron, steel, etc., a light coat of nickel before putting them in the brass bath. They will not rust as easily and will take a better finish. For plain articles, after they have been run through the hot water, heat in any kind of heater and while hot dip the article, still on wires, into kerosene. This will penetrate into the pores and the work will not spot out easily. As kerosene is used by many polishers it will be of advantage to the buffer, if the pores are a trifle oily.

D. WITTIG.

THAT NEW ALUMINUM ELECTRIC LINE.

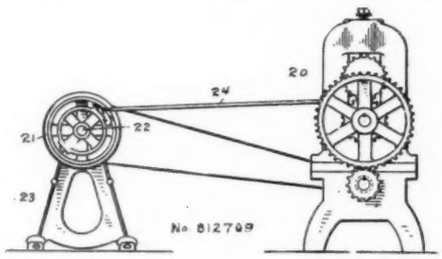
Further particulars about the new aluminum transmission line mentioned in the February number of THE METAL INDUSTRY indicate that it is to be one of the largest and most important ever built. This transmission line is being erected by the Niagara, Lockport and Ontario Power Company and the current will be transmitted from their power house located at the foot of the horse shoe falls on the Canadian side of the Niagara River to Syracuse, a distance of 162 miles. There are nine aluminum cables, each containing 19 No. 5 wires. They run straight north on the Canadian side for four miles and then are strung over the rushing rapids of the Niagara River from steel towers built on each side of the shore, thence to Syracuse. The line will furnish light and power to the industrial section located in the central part of Western New York.

PATENTS

REVIEW OF CURRENT PATENTS OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

812,852. February 20, 1906. Machine For Forming Sand Cores. C. C. Korns, Johnstown, Pa. The machine consists of a frame and a cylinder, which latter raises and lowers the core box table towards and away from a fixed platen by means of lifting rods. Provision is made for lifting the table together with the core box and lowering it as well as to invert it entirely. After the core is ejected the plate with the core upon it is removed and the core is baked or dried on the plate without handling.

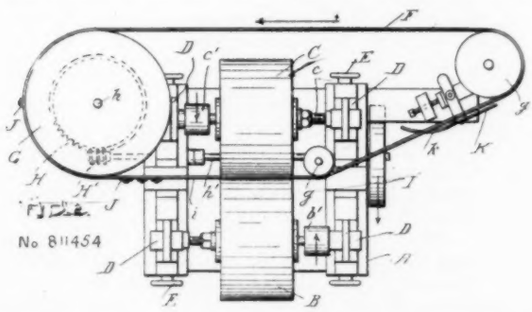
812,709. February 13, 1906. Drum for Coiling Metal. W. R. Webster, Bridgeport, Conn. The drum is intended for coiling sheet metal, wire, rod, etc., while cold. The illustration gives an elevation, illustrating the use of the drum in connection with



wire rod rolls. In the figure, 20 represents the roll and 21 the drum proper. The latter is loosely mounted upon a shaft 22, journaled in frame work 23. The wire is delivered to the drum by an adjustable tube 24. The coiling drum comprises a loose drum with a peripheral opening and a locking surface and a rotating carrier within the drum. The construction is such that the insertion of the end of a piece of metal between them will connect them together and the drum will be rotated by the carrier and the metal coiled upon it.

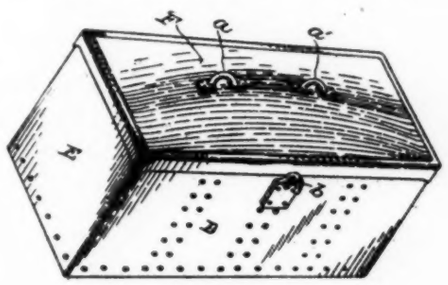
812,820. February 20, 1906. Molding Machine. C. J. Caley, New Britain, Conn. The machine belongs to the oscillating yoke type, in which a stationary table supports a flask and an oscillating yoke or rammer compresses the sand. In order to overcome the difficulty encountered in the operation of machines of this class on account of vibration, which results in uneven molds, co-operating guide members are provided which are brought into play just as the rammer is in its operating position. Vibration of the arms of the rammer is thus reduced to a minimum.

811,454. January 30, 1906. Polishing Machine. J. A. Stowell, Leominster, Mass. The machine is intended for polishing hair-pins and similar articles. The accompanying illustration shows



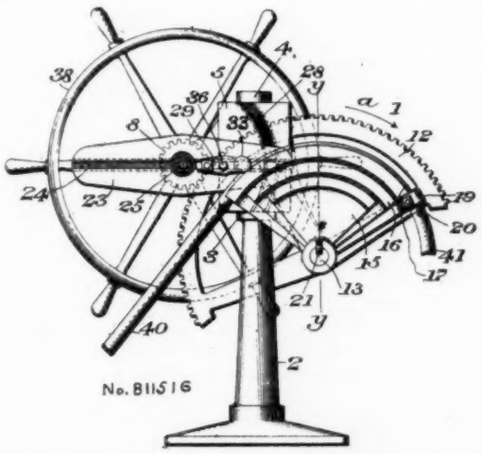
a plane view of the machine. It has two polishing wheels or buffs B and C which are formed of soft material such as cloth. Arrangements are made for the polishing wheels to be pressed together by hand wheels E with any desired pressure. The carrier F for the hair-pins consists of an endless belt of leather or similar material; G is the driving pulley and g the guide pulley. K is an adjustable knock-off plate for the pins.

812,943. February 20, 1906. Annealing Box. J. J. Markey, Anderson, Ind. The annealing box is intended for annealing sheets of metal and so constructed that it has a top which, when



heated to the highest degree in use, will not sag of its own weight and will not cause the sides of the box to bulge out. The box comprises a body D and ends E of sheet iron and a crowning top F formed separately of a sheet of metal and welded to the sides of them. A pair of lifting eyes *a* and a^1 are attached to the top. The box is re-inforced in the interior by heavy metal ports. It is open at the bottom so that it can be put on a stand on which plates of metal will be piled to be annealed, the box being used as a cover. The whole is then placed in a furnace and heated.

811,516. January 30, 1906. Pipe Bending Machine. J. H. Mull, Philadelphia, Pa. The machine comprises a post 2 with support 4 for a block or carrier 5. A pinion 8 meshes with



a quadrant gear 12, mounted on the shaft 13. On the outside of the shaft 13 are mounted a series of quadrant-shaped bending dies, 15, 16 and 17. The key or spline 21 renders any of the bending dies operative as desired. As the machine is light in weight it can be carried from the shop to the job and can be secured quickly to any available support. It is claimed that piping of brass, copper, steel, etc., up to two inches in diameter, can be bent cold in this machine.

811,725. February 6, 1906. Means for Soldering Aluminum. A. W. King, London, England. The patent relates to a special solder which is made up in the following manner: Soft solder, generally composed of one part of tin and two parts of lead, is melted together with zinc and aluminum in the following proportions: 10 parts by weight of soft solder, 5 parts by weight of pure zinc, and 5 to 8 parts by weight of aluminum. The ingredients are melted in iron pots, well stirred and then poured into a mold.

TRADE NEWS

TRADE NEWS OF INTEREST DESIRED FROM ALL OF OUR READERS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

Richards & Company, Boston, Mass., are New England agents for Taylor Crucibles.

The F. A. Richardson Company, manufacturers of hardware specialties at Boston, Mass., have moved from Dock Square to Harvard Place.

On another page of this issue will be found particulars of a good line of automatic valve machines and Fox monitor lathes, which are for sale.

The F. W. Wakefield Brass Company will shortly locate in Vermillion, O., subscriptions for which are now being collected and the necessary arrangements being made.

The Axtell-McKee Manufacturing Company has succeeded F. W. Axtell, Fort Worth, Tex. The company are wholesale dealers in wind mills, pumps, well casings and gasoline enignes.

The Franklin H. Kalbfleisch Company, manufacturers of chemicals, have moved to new quarters at Broadway and 16th street, New York. They were formerly at 31 Burling Slip, New York.

The Riverside Metal Refining Company, Connellsville, Pa., have re-established their Pittsburg office at Room 623, Wabash Building, with Mr. A. L. Klaus in personal charge as sales agent.

The Brass Foundry & Heating Company, Peoria, Ill., have purchased a piece of land 63 by 181 feet at 709 South Adams street and will shortly erect a store building and factory which will cover the entire lot.

The Barlow Manufacturing Company, makers of brass specialties at Holyoke, Mass., have increased their capital from $37,500 to $75,000 in order to meet the demands of the rapidly increasing volume of business.

The directors of the American Wire and Supply Company, of Attleboro, Mass., have decided to discontinue the business. The company recently lost their manager, Mr. Manton Dailey, who died on January 10.

The Elizabethport Brass Foundry Company was recently incorporated at Elizabeth, N. J., with $25,000 capital. The incorporators are F. J. Freund, C. F. Hinde and W. J. Rose. The company is located at 137 Elizabeth avenue, Elizabeth, N. J.

John C. Culbert, dealer in old metals, Providence, R. I., informs us that he is in the market for 250,000 pounds red or yellow washings, 250,000 pounds red or yellow grindings, 250,000 to 500,000 pounds copper wire, or any of these in smaller lots.

Owing to an increase in business, the Torrington Manufacturing Company, of Torrington, Conn., will enlarge and improve their works. Their capital stock has been increased to $60,000. They manufacture brass working machinery of all kinds.

The Diamond Machine Company, makers of grinding and polishing machinery at Providence, R. I., have opened a salesroom at 18 Dey street, New York, which is in charge of Mr. H. F. Frevert, a man well known to the machinery trade.

The Standard Sanitary Manufacturing Company, Louisville, Ky., are about to erect a building 80 by 135 feet to be used for office purposes and storage and the extension of the brass finishing department. The approximate expenditure will be about $50,000.

Franklin Burton, receiver for the Ansonia Smelting and Metal Company, Ansonia, Conn., has filed a list of the claims against the company. The claims allowed amount to $13,715.99, all of which are paid. The plant will be sold and the concern will go out of business.

The Reliance Metal Company, Pittsburg, Pa., have purchased the plant of the Iron City Brass Foundry Company, 5325 Butler street, and are now moving into their new works, where they will have larger quarters for buying and selling brass and copper ingot and the white metals.

The Edward F. Smith Company, of New Haven, Conn., has been incorporated with a capital stock of $20,000 by Edward F. Smith and H. F. Richards, of New Haven, and O. B. Blackburn, of New York. The concern will manufacture brass, copper and aluminum wire, wirecloth, railings, etc.

The Board of Directors of the Scovill Manufacturing Company, makers of brass goods at Waterbury, Conn., has recommended an increase in the capital stock of $812,500 to bring the total up to $4,062,500. This increase will be used to make extensive improvements in the Waterbury works.

White & Brother, smelters and metal dealers, Philadelphia, Pa., announce that in order to meet the increasing demand for White's ingot metal they have recently enlarged their works and have built a modern up-to-date chemical laboratory which will enable them to make ingots of any chemical composition.

The large metal house of Phelps, Dodge & Company, of New York, notified the metal industry during the past month that they would retire from the general jobbing trade and would devote all their energies to copper and their large copper interests. They are owners of a number of copper mines.

The E. Stebbins Manufacturing Company, Springfield, Mass., has been sold by Major H. M. Brewster and his associates to L. J. Powers, F. Harris, F. L. Chapin and A. H. Warren, who will continue the business along the same lines as heretofore. The company is capitalized at $50,000 and manufactures plumbers' brass goods.

The Brunswick-Balke-Collender Company, Chicago, Ill., are selling to dealers, manufacturers and large consumers a line of "Easybright" polishes, embracing a metal polish for brass and other outside metals, and a furniture and fixture polish; they also have a jet black air-drying enamel for iron, tin and other metals.

The Record Press, Greenville, Ky., want samples and trade prices on aluminum, brass and copper sheets for making embossed signs and advertising plates. The company has a Francis engraving machine on which they are doing considerable work and they want to correspond with makers or jobbers of novelties for engraving, such as hat markers, bag tags, key ring makers and the like.

The firm of Fitz, Dana & Brown has been established at 445-447 Pearl street, New York, to deal in pig tin, tin plates, sheet zinc, antimony, lead, spelter, etc. Messrs. Fitz and Dana are members of the Boston firm, Fitz, Dana & Co., while Mr. Brown was formerly in charge of the city department of Phelps, Dodge & Co., New York.

The New Jersey Aluminum Company, of Newark, N. J., have outgrown their present quarters and will put up an additional building. They manufacture all kinds of aluminum novelties,

make automobile castings a specialty. They made the large 8-cylinder casting and all the aluminum parts for the 250 horse power Vanderbilt racer recently built.

The Hanson & Van Winkle Company, manufacturers of polishing and plating supplies at Newark, N. J., write us that there are now over 200 of their mechanical electro-plating apparatus in successful daily use. These platers are built in sizes from 50 to 500 pounds capacity and are used in all solutions for plating a large variety of small articles and parts.

It seems to be a fact that there is a clique of metal dealers in Niagara Falls, the members of which encourage boys to steal metal from the local power companies. Lately three boys entered a manhole of the Niagara Falls Power Company for the purpose of stealing the cables therefrom and, after having cut away the lead and insulation, were very seriously burned by a short circuit which resulted.

The Canton Brass & Faucet Company, Canton, O., makers of patterns and castings in brass, iron, babbitt, white metal, etc., are desirous of moving to Peoria, Ill., to occupy the buildings of the Peoria Steel and Tool Company. The company wishes to incorporate with $50,000 capital, $30,000 paid up, and it is reported that they have plenty of orders, but limited facilities and insufficient capital to enter the business on a large scale.

The Roberts Brass Manufacturing Company, Detroit, Mich., has been incorporated under the laws of the State of Michigan with a capital stock of $200,000 to manufacture a line of high grade brass goods for steam, water and gas. They are erecting a new two-story factory building, 45 x 240, embodying all the latest improvements. They are now engaged in the manufacture of patterns and tools and expect to commence manufacturing goods for the trade about June 1st.

Chas. J. Bogue, manufacturer of electrical machinery at 213 Centre street, New York, is now supplying the Western Electric Company a line of ten sizes, 50 to 5,000 amperes, of low voltage generators for electro-plating, storage battery charging, circuit breaker work and instrument testing with which the Western Electric Company fit a line of their own motors in direct connection on the same base. Sizes larger than 5,000 amperes are built to purchaser's specifications.

The Frevert Machinery Company have opened a salesroom and offices at 18 Dey street, New York, where they carry a complete line of new and second-hand metal working tools and machinery of every description. They also manufacture a line of newly designed hand-power traveling cranes, trolleys, hoists and overhead tracks, which combine many valuable improvements and new features. H. F. Frevert, the principal of the company, has had a wide experience in the machinery tool business.

The Light Manufacturing and Foundry Company, of Pottstown, Pa., have in addition to their regular work on automobile castings taken up the manufacture of bearing metals for automobiles which they sell under the name of automobile brand of Ajax Plastic Bronze. For automobile parts, they sell also Ajax Manganese Bronze in the automobile and autoboat industry. These two brands of metals will be controlled in the United States by the Light Manufacturing and Foundry Company.

The Fowler Brass Works have established a factory at 2333-37 Wabash avenue, Chicago, Ill., for the manufacture of their "Blue Ribbon Quality" plumbing brass goods. H. N. Fowler, president and manager, is well known to the manufacturing and jobbing brass trade of the West, having formerly been with the Thomas Brass & Metal Company, Milwaukee, Wis.; the Union Brass & Metal Company, St. Paul, Minn., and during the past two years having been assistant manager of the National Brass & Metal Company, Minneapolis, Minn.

Among the proposals of the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., are the following: Schedule 389, sheet brass; Schedule 390, bronze castings, bronze rod and tubing; Schedule 391, sheet zinc, brass tubing; Schedule 392, brass and iron bolts and nuts, ingot copper, galvanized sheet steel, sheet tin, slab zinc, brass pipe, valves, lubricators, copper and brass sheet and pipe, foundry facings. Bids on all of the above are to be opened March 20. Further particulars and blanks may be had from the Bureau.

Under the head "Foreign Trade Opportunities" the *Daily Consular and Trade Reports* for February 27 speaks of an inquiry (No. 11) for lead from a party in Syria who desires direct communication with exporters of lead in pigs and sheets; Inquiry No. 12 from a firm in Genoa, Italy, wishing to negotiate with manufacturers of red copper, in sheets, for sheathing ships; Inquiry No. 13 from a Shanghai concern who offer their services to merchants and manufacturers who wish to establish themselves in the Chinese market, and are open to receive samples, price lists, etc., and dispense all kinds of information. Full information regarding these inquiries is on file at office of Bureau of Manufactures, Washington, D. C. Applicants for information should refer to file number given above in each case.

ROLLING MILLS

Particulars of an opportunity to start a brass and copper tube mill will be found on another page.

The Canada Brass Rolling Mills, Toronto, Canada, have shut down their mill and will not start again until their new buildings are completed and the machinery installed.

The parties who were interested in building a German silver rolling mill at Wallingford, Conn., to be called the Wallingford Metal Company, have now under consideration the establishment of this mill at Waterbury, and it is the intention of the interested parties to erect a plant at an early date on a site they have already secured in Waterbury. The leading individuals in the enterprise are Robert D. Somers, I. N. Welton, Frank P. Welton, Abel Kenworthy and C. E. Welton.

The latest news about the Michigan Copper and Brass Company, the new rolling mill corporation of Detroit, Mich., is that the plans for the building are being drawn by the architect, Mr. John Scott, of Detroit. The company will be ready to receive bids for the construction of the building early in March. As soon as the contracts are let the work will be pushed as fast as possible. The company having secured Mr. Hugh L. Thompson as the consulting engineer, the management believes that they will have as complete and up-to-date a plant as any in the United States. George H. Barbour, president of the company, is executive of the Michigan Stove Company, and H. B. Ledyard, one of the directors, is chairman of the executive board of the Michigan Central Railroad. THE METAL INDUSTRY has mentioned in former issues the names of all of the officers and directors.

In the February number of THE METAL INDUSTRY there was published a report of the new rolling mill of the Pittsburgh Reduction Company to be erected at Niagara Falls, N. Y., and the latest reports have it that the company will build rolling mills at Massena, N. Y. Mr. A. V. Davis, the general manager of the company, is reported as saying: "We have made large investments in real estate at Massena, and this, taken in connection with the water power which we own there, offers greater advantage and cheaper facilities for our business than can be had at Pittsburg." It is also announced that the company anticipate the removal of its works from New Kensington, having all its rolling mills at Niagara or Massena. The company's reduction works are at present located at Niagara and Massena, N. Y., and Shawinigan Falls, Canada, and their rolling mill is at New Kensington, 18 miles from Pittsburg. As we go to press no statement from the company is obtainable.

NEW CATALOGUES

"Kewanee 'Y' Valves" is a small pamphlet describing and presenting cutaway views of the line of valves made by the Western Tube Company, Kewanee, Ill.

The Brass Founders' Supply Company, 20 Prospect street,

Newark, N. J., have issued catalogue No. 12, which shows a full line of supplies for the foundry.

The A. W. Harris Company, Providence, R. I., have issued a very effective 32 page booklet devoted to their petroleum lubricating oils and other lubricating compounds.

The Monarch Engineering & Manufacturing Company, Baltimore, Md., have issued a folder devoted to their Steele-Harvey Crucible Melting Furnace, which is used in connection with oil and air.

The Zucker & Levett & Loeb Company, 526 West Twenty-fifth street, New York City, have just issued new leaflets describing their plain and enamelled lined iron tanks and steam kettles for platers' use.

Three firms which are making a specialty of cold galvanizing apparatus and who issue special catalogues are: Hanson & Van Winkle Company, Newark, N. J.; Zucker & Levett & Loeb Company, 526 W. 25th Street, New York, and U. S. Electro-Galvanizing Company, 9 Park Avenue, Brooklyn, New York.

The Hanson & Van Winkle Company, Newark, N. J., have for distribution to interested parties a catalogue on cold galvanizing which presents a comparison of the cold and hot processes in regard to cost, working, durability, etc. They offer to galvanize any samples of work sent to them, making no charge, and furnish estimates for plants giving full details.

Geo. E. and Chas. P. Taylor, proprietors of the St. Paul Electro-Plating Works, St. Paul, Minn., have a small, neatly printed folder in which they are making a bid for the trade of the householder in the line of replating and refinishing old table silver, lamps, andirons, automobile parts and the like. Their idea is an excellent one and their folder a worthy exponent of the idea.

A new issue of catalogue section "R," Rolling Mills for Rolling Brass, Copper, Silver, etc., in sheets and rods, has been published by the Waterbury Farrel Foundry and Machine Company, Waterbury, Conn. This section—one of a list of fifteen—comprises 72 pages of well edited, well printed and well illustrated matter in regard to rolling mill equipment. Each machine is illustrated, and there accompanies full data in regard to uses, measurements, weights, etc.

FIRES

The Roberts Chemical Company, of Niagara Falls, N. Y., has suffered another loss by fire, but steps were at once taken to rebuild and their customers for potash will be taken care of.

A fire which was held to small proportions recently threatened the brass and iron foundry of A. Reed & Sons, Gloucester, Mass. The patterns and equipment were not much harmed, most of the loss of about $1,000 being done to the building itself.

ASSOCIATIONS

The 154th meeting of the Philadelphia Foundrymen's Association was held at the Manufacturers' Club, 1409 Walnut street, February 7th, with an attendance of thirty-six, representing some of the largest metal houses in the East. Howard Evans, of the J. W. Paxson Company, Philadelphia, Pa., is the secretary of the association.

American Consul Norton, of Smyrna, supplies a report on the introduction of machine tools in which he says that drill presses, planers, shapers and lathes now come almost exclusively from England, that the demand for hand and machine tools is growing and that it would be well worth while for American manufacturers to look into the possibilities of Smyrna as a market for their goods.

The meeting of the Cincinnati, O., Foundry Foremen, scheduled for February 10, was interrupted early in the evening by a fire in the nearby works of L. Schreiber & Son, to which all the members withdrew. When the fire had been put out it was too late to resume the meeting, and it was postponed till February 24. Secretary Karl H. Caldwell reports that the "boys" enjoyed watching the fire like a lot of youngsters.

By a unanimous vote the New York Metal Trades Association at a special meeting adopted a resolution providing for amalgamation with the National Metal Trades Association. The New York association will cover a territory including New York, Jersey City, Hoboken, Newark and other nearby towns. Henry C. Hunter, of New York, who is secretary of the New York association, will be appointed a deputy commissioner of the national organization.

MEETINGS

At the recent annual meeting of the Bristol Brass Company, Bristol, Conn., the stockholders voted to authorize the directors to increase the capital stock of the company by an amount not to exceed $200,000, which will bring the total capitalization to $700,000. Of this increase $100,000 will be issued to stockholders at par, which is $25.

At the recent annual meeting of the stockholders of the American Tube and Stamping Company the following directors were elected: Schuyler Merritt, Stamford; Elwood Hendrick, New York; Charles R. Wilmot, Orange, N. J.; William C. Coffin, Pittsburg, Pa.; Alfred L. Ferguson, New York; Charles G. Sanford, C. D. S. Miller, Enoch P. Hincks, Frank A. Wilmot, Frank Miller and Jesse B. Cornwall, Bridgeport. At the conclusion of the stockholders' meeting the directors re-elected these officers for the ensuing year: Frank A. Wilmot, president and treasurer; Clarence D. S. Miller, vice-president; A. J. Middlebrook, secretary and assistant treasurer; Henry W. Hincks, assistant secretary.

At a meeting held February 27 the stockholders of the American Brass Company, Waterbury, Conn., voted to increase the capital of the company from $10,000,000 to $12,500,000. Stockholders will be allowed to subscribe for the new issue at the par value of $100 per share. At the same meeting the old board of officers and directors was re-elected as follows: President, Charles F. Brooker, Ansonia; first vice-president, E. L. Frisbie, Jr., Waterbury; second vice-president, A. A. Cowles, New York; third vice-president, James S. Elton, Waterbury; treasurer, John P. Elton, Waterbury; secretary, Gordon W. Burnham, New York; assistant secretary, James A. Doughty, Torrington; directors, the above and Edward T. Coe, Torrington; Chandler N. Wayland, Thomas B. Kent, D. W. James, Cleveland; P. Dodge, T. B. Burnham, Edward Holbrook and J. J. Sinclair, New York.

PERSONALS

M. C. Moore, formerly proprietor of the Syracuse Plating Works, Syracuse, N. Y., has gone to California.

Mr. Alexander Henderson has succeeded Mr. Jeremiah Howe as superintendent of the Detroit Copper and Brass Rolling Mills, Detroit, Mich.

Albert Ladd Colby has opened an office as consulting and inspecting engineer and iron and steel metallurgist at 477 Central Park West, New York.

"I look for THE METAL INDUSTRY every month as I do for my whiskey," so spoke one of our faithful readers. While THE METAL INDUSTRY believes in temperance, we at least appreciate the compliment.

Dr. Richard Moldenke, secretary of the American Foundrymen's Association, has been away on a Western trip as far as California. During his journey he made a number of arrange-

ments for the Foundrymen's convention, which is to meet in Cleveland next June.

Mr. C. W. Leavenworth has taken the position as treasurer of R. Wallace & Sons Manufacturing Company, Wallingford, Conn., which was formerly held by his father, Colonel W. J. Leavenworth, recently deceased. Colonel Leavenworth had been connected with this company since 1877.

Mr. John P. Elton, treasurer of the American Brass Company and the Waterbury Brass Company, and an officer in many other important corporations, has been elected president of Blake & Johnson, Incorporated, of Waterbury, Conn., taking the place of Robert R. Stannard, who died on January 4.

Mr. Chas. S. Morse has become the general superintendent of the Rome Brass and Copper Company, Rome Tube Company and the Rome Novelty Company, all of Rome, N. Y. Mr. Morse was formerly general superintendent of the Benedict & Burnham Manufacturing Company, of Waterbury, Conn.

In a late Eastern trip Mr. Copeland, superintendent of the Rockford Silver Plate Company, Rockford, Ill., and Edward Taylor, of the same company, made a round of Eastern factories in the plating line and found a most cheerful and hopeful feeling among the trade in regard to the business prospects for 1906.

THE METAL INDUSTRY has helped platers in innumerable ways but at last one has gone beyond our limit and turned ventriloquist. He writes: "I have given up the plating business for the time being and have taken up theatrical work. I have found your paper a most valuable one and of great help and assistance to the plater."

Mr. Walter C. Allen, who has held the position of assistant general superintendent of The Yale & Towne Manufacturing Company, Stamford, Conn., has assumed under the direction of the president, Mr. Henry R. Towne, the duties of general superintendent, the position held by Frederick Tallmadge Towne, who died on February 4, 1906.

Mr. Hugh L. Thompson, of Waterbury, Conn., has been engaged as consulting engineer for the entire new plant of the Michigan Copper and Brass Company, Detroit, Mich. Mr. Thompson's long engineering experience with the brass and copper industry will enable the new mill to have the latest and best engineering equipment.

Mr. William Nesterman, superintendent of the Coe Brass Manufacturing Company, of Ansonia, Conn., while driving with his wife was run down by the midnight north bound train at Seymour, Conn., on Friday, February 10. Both were seriously injured and were taken to the Waterbury Hospital. Mr. Nesterman has since fully recovered.

DEATHS

Paschal P. Emory died at Springfield, Mass., February 10, aged 81. Mr. Emory was born in Groton July 21, 1825, and went to Springfield in 1851, where he established the firm of P. P. Emory & Company, coppersmiths and brass founders, which business he sold out upon retiring in 1901.

John Stanton, the first president of the old New York Mining Exchange and one of the best known copper men of his generation, died in New York, February 23. He was president of a number of mining companies and for many years executive officer and statistician of the Copper Producers' Association of the United States.

The Haydenville Company, of Haydenville, Mass., have lost their superintendent through the death of J. H. Hills, who was connected with the company for many years.

The founder of the J. W. Paxson Company, of Philadelphia, Pa.—John W. Paxson—died on January 3 at Philadelphia, age 87 years.

NEW YORK, March 7, 1906.

COPPER.—The London market for standard copper has been less active and prices have changed very slightly. Opening at £78 10s. the market touched £77 10s. on the 16th and later reacted to £78 17s. 6d. on the 27th and closed at £78 15s. The persistent attempt of the short interest in face of the small stocks did not have much lasting effect on the market.

The New York Market has held remarkably steady in face of hardly any demand from consumers and the lower quotations given out by certain parties interested in establishing low quotations on which to base their purchases. It is reported that sales of small lots were made at 18 cents for electrolytic, while the leading producer made large sales at 18¼ cents, but outside of this sale there has been very little buying and the other large interests have not had occasion to lower their price. The larger consumers will shortly have to come into the market and from present outlook sales will be made at 18⅜ to 18½ cents. Bare copper wire was put down ½ cent per pound early in the month. The market looks in good shape with producers holding firm for the above figures. The exports for the month were 15,201 tons, against 17,508 tons a year ago. So far the exports are 8,200 tons less than for the same period in 1905. We quote the market for spot or futures, Lake and Electrolytic, 18⅜ to 18½ cents; castings brands, 18 cents.

TIN.—The price of tin in London has held very steady, and with small fluctuations, prices at the close are £1 lower than on the first.

The New York market has been dull and quiet, deliveries are estimated at 3,000 tons, while the total shipments from the Straits to all parts were only 4,445 tons, of which 1,130 tons come to America. The total visible supply of tin is 13,414 tons to-day, against 14,911 tons a year ago. We are supposed to have a spot stock of 2,461 tons with 3,255 tons afloat, making 5,716 tons the visible supply of America. Prices at the close were spot, 5 and 10 ton lots, 35.75 cents, with futures 5 to 10 points lower.

LEAD.—The foreign lead market has held steady, closing at £16 2s. 6d.

In the New York market the leading sellers dropped the price of lead $5 per ton, making the New York shipment price 5.35, against 5.60 last month. Spot lots of lead are more or less scarce at 5.45 to 5.50.

SPELTER.—The foreign spelter market has been more or less weak and prices show a decline for the month of £1 12s. 6d.

The New York market has been dull and quiet at around 5.95 to 6 cents in St. Louis. The position of the metal is good, ores are scarce and there are no stocks to draw on, but the weakness abroad has kept buyers shy and the home market soft. At the close there is a firm feeling noticed and possibly higher prices may result. We quote the market to-day, 6.10 to 6.15, New York delivery, carload lots.

ALUMINUM.—The scarcity of aluminum continues, and consumers of this metal are shopping all over the country in their effort to get a sufficient supply of sheet. Ingot metal is reported obtainable from the manufacturers. The utilization of the aluminum for electric power purposes is consuming quantities of this metal and the recent announcement of the establishment of new power lines at Niagara will still further increase the consumption of the metal for electrical purposes. In our January number we announced the increase on the list prices of 5 per cent. and the discounts on large orders for sheet have been abolished.

SILVER.—The market has been very quiet, with slight

changes. London opened at 31⅛, advanced to 13-16, and closed at 30⅝. The New York followed the London prices, closing at 65⅞, official.

SHEET COPPER.—There is more enquiry for sheets, and buyers will probably come into the market. Prices are unchanged and with the strong position of ingot copper no changes are likely in sheets.

OLD METALS.—The dullness of some three or four weeks past has given place to a brisk enquiry and good business is reported. Dealers are asking higher prices for all kinds of copper scrap and the market generally is in better shape than one month ago. Slab zinc dross has been more or less weak, owing to the soft spelter market and the lower foreign cables and buyers of drosses and skimming are not ready to make contracts over the year at anything like the prices ruling today.

TRADE WANTS

AN EXCHANGE FOR THE WANTS OF THE METAL TRADES.

Advertisements will be inserted under this head at 30 cents per line, 4 lines one dollar, for each insertion. Answers sent in our care will be forwarded.

MACHINERY AND EQUIPMENT.

WANTED—MAKER of MACHINE for producing TIN TUBES such as are used in the manufacture of CASKET HARDWARE. Address TIN TUBES, care THE METAL INDUSTRY.

WANTED—A BRITTON STRETCHING MACHINE, new or second hand; preferably the latter. Address BRITTON, care THE METAL INDUSTRY.

WANTED—One SLITTER or TRIMMER for ⅛" stock; one pair 10" 2 high mill, with pinions, with or without rolls; two pair 8" 2 high mill, with pinions, with or without rolls; One Roll Grinding Machine. Address TRIMMER, care THE METAL INDUSTRY.

FOR SALE.

FOR SALE.—One second-hand HILL CRUSHER for brass ashes, small size. Address R. S. T., care THE METAL INDUSTRY.

FOR SALE.—SECOND HAND SAFE in good condition, combination lock. 36 x 26½ x 16 inches inside. Price $75. Address SAFE, care THE METAL INDUSTRY.

FOR SALE—150 sets of IRON FLASKS, 12 x 15 x 5½, planed face and back. Will sell cheap. W. GISRIEL & SON, Guilford and Girard avenues, Baltimore, Md.

FOR SALE—PLATING PLANT (Western New York) established 1887 and doing good, profitable business. Good customers of long standing. Will remain with buyer a few weeks if desired to give information in regard to business. Address PLATING PLANT, care THE METAL INDUSTRY.

HELP WANTED.

WANTED—PATTERN MAKER and SHOP CARPENTER; one who is capable of reading drawings and building propeller wheels of any design. Also general jobbing work for a brass foundry. Address PATTERN MAKER, care THE METAL INDUSTRY.

WANTED—A first class TOOL MAKER for brass shop; one who thoroughly understands forming tools, box tools and general brass worker's tools; must have good mechanical ideas. Shop employs 15 men; manufactures ground key cock work and general contract work in St. Louis. State age, experience and salary expected. Address TOOL MAKER, care THE METAL INDUSTRY.

WANTED for our new shop—First class, experienced monitor hands and brass workers; those accustomed to steam work preferred. Apply at the works of the NATHAN MANUFACTURING COMPANY, 416 East 106th street, New York.

WANTED—SUPERINTENDENT for a new aluminum factory; must be experienced; to be in full charge; given interest if found satisfactory. Address ALUMINUM SUPERINTENDENT, care THE METAL INDUSTRY.

SITUATIONS WANTED.

(Persons answering advertisements under this head should state whether they desire position in Brass or Iron Foundry, their specific branch of Plating or Finishing, etc.)

POSITION WANTED as SUPERINTENDENT or FOREMAN of BRASS FOUNDRY. Have had years of experience in handling large crews on a great variety of work. Am thoroughly familiar with machine molding, oil furnaces and modern foundry appliances. Would invest in a business of merit. Address W. E. S., care THE METAL INDUSTRY.

POSITION WANTED as SUPERINTENDENT of factory manufacturing light hardware in brass or iron; prefer New York City or vicinity. Address N. Y. C., care THE METAL INDUSTRY.

SUPERINTENDENT—Position wanted in factory manufacturing brass goods; executive, mechanical, and inventive ability. Address B. G. S., care THE METAL INDUSTRY.

POSITION WANTED by experienced young man as FOREMAN OF PLATING AND POLISHING DEPARTMENT. Best of references. Address G. B., care THE METAL INDUSTRY.

WANTED—Position as SUPERINTENDENT of hardware factory. Thoroughly understands the manufacture of builders' and other light hardware. Address S. H. F., care THE METAL INDUSTRY.

MISCELLANEOUS WANTS.

WANTED—A small brass foundry, with or without machine shop, preferably in suburban location near New York. Address FOUNDRY, care THE METAL INDUSTRY.

CASH PAID for old precious metals and minerals in any form. Gas mantle dust, bronze powder, bismuth, platinum, mercury, nickel, etc. Address JOSEF RADNAI, 284 Pearl street, New York City.

INFORMATION BUREAU

Subscribers intending to purchase metals, machinery and supplies and desiring the names of the various manufacturers and sellers of these products can obtain the desired information by writing to THE METAL INDUSTRY. Our Information Bureau is for the purpose of answering questions of all kinds. Send for circular.

HEADQUARTERS.

When visiting New York, the out-of-town friends of THE METAL INDUSTRY are invited to make our office their headquarters, where a writing desk and telephone service will be at their disposal. Every one interested in the non-ferrous metals and alloys is invited to call.

Metal Prices, March 7, 1906

METALS.	Price per lb.
COPPER, PIG, BAR AND INGOT AND OLD COPPER	
Duty Free. Manufactured 2½c. per lb.	
Lake, car load lots	18.75
Electrolytic, car load lots	18.50
Casting, car load lots	18.25
TIN—Duty Free.	
Straits of Malacca, car load lots	36.00
LEAD—Duty Pigs, Bars and Old 2⅛c. per lb.; pipe and sheets 2½c. per lb.	
Pig Lead, car load lots	5.45
SPELTER—Duty 1½c. per lb.	
Western car load lots	6.15
ALUMINUM—Duty Crude, 8c. per lb. Plates, sheets, bars and rods 13c. per lb.	
Small lots	38.00
100 lb lots	36.00
Ton lots	35.00
ANTIMONY—Duty ¾c. per lb.	
Cooksons, cask lots	16.50
Hallets, cask lots	15.75
Other, cask lots	15.50
NICKEL—Duty 6c. per lb.	
Large lots	.45 to .50
Small lots	.50 to .65
MANGANESE—Duty 20%	.80
MAGNESIUM—Duty Free	$1.50 to $2.00
BISMUTH—Duty Free	1.50 to 1.60
CADMIUM—Duty Free	.95 to 1.00
PHOSPHORUS—Duty 18c. per lb.	
Large lots	.42
Small lots	.50 to .75
	Price per oz.
GOLD—Duty Free	$20.67
SILVER—Duty Free	.65¼
PLATINUM—Duty Free	24.00
QUICKSILVER—Duty 7c. per lb. Price per Flask	41.00

OLD METALS.	Price per lb.	
Heavy Cut Copper	16.50	17.50
Copper Wire	16.00	17.25
Light Copper	15.00	15.50
Heavy Mach. Comp.	14.25	15.50
Heavy Brass	11.00	12.00
Light Brass	9.00	10.25
No. 1 Yellow Brass Turnings	10.00	10.75
No. 1 Comp. Turnings	12.00	13.00
Heavy Lead	4.85	5.10
Zinc Scrap	4.50	5.00
Scrap Aluminum, sheet, pure	22.00	25.00
Scrap Aluminum, cast, alloyed	12.00	18.00
Old Nickel	15.00	25.00
No. 1 Pewter	26.00	27.00

SILICON COPPER—	Price per lb.
500 lb. lots	.35
100 lb. lots	.36
Small lots	.38
PHOSPHOR COPPER, 5%	.24 to .26
Phosphor Tin	.41 to .43
Brass Ingot, Yellow	.13 to .14
Brass Ingot, Red	.15 to .16
Bronze Ingot	.16 to .17

ZINC—Duty, sheet, 2c. per lb.	Price per lb.
600 lb. casks	8.50
Open casks	9.00

PRICES OF SHEET COPPER.

SIZES OF SHEETS.		96oz. & over 75 lb. sheet 30x60 and heavier	64oz. to 96oz. 50 to 75 lb. sheet 30x60	32oz. to 64oz. 25 to 50 lb. sheet 30x60	24oz. to 32oz. 18¾ to 25 lb. sheet 30x60	16oz. to 24oz. 12½ to 18¾ lb. sheet 30x60	14oz. and 15oz. 11 to 12½ lb. sheet 30x60
		CENTS PER POUND.					
Not wider than 30 ins.	Not longer than 72 ins.	23	23	23	23	23	24
	Longer than 72 ins. Not longer than 96 ins.	23	23	23	23	23	24
	Longer than 96 ins.	23	23	23	23	23	25
Wider than 30 ins. but not wider than 36 ins.	Not longer than 72 ins.	23	23	23	23	23	25
	Longer than 72 ins. Not longer than 96 ins.	23	23	23	23	23	25
	Longer than 96 ins. Not longer than 120 ins.	23	23	23	23	24	26
	Longer than 120 ins.	23	23	23	24	25	
Wider than 36 ins. but not wider than 48 ins.	Not longer than 72 ins.	23	23	23	24	25	27
	Longer than 72 ins. Not longer than 96 ins.	23	23	23	24	26	28
	Longer than 96 ins. Not longer than 120 ins.	23	23	23	25	27	31
	Longer than 120 ins.	23	23	24	26	29	
Wider than 48 ins. but not wider than 60 ins.	Not longer than 72 ins.	23	23	23	24	26	29
	Longer than 72 ins. Not longer than 96 ins.	23	23	23	25	27	32
	Longer than 96 ins. Not longer than 120 ins.	23	23	24	26	29	
	Longer than 120 ins.	24	24	25	27	31	
Wider than 60 ins. but not wider than 72 ins.	Not longer than 96 ins.	23	23	24	26	31	
	Longer than 96 ins. Not longer than 120 ins.	23	23	25	28	33	
	Longer than 120 ins.	24	24	26	31		
Wider than 72 ins. but not wider than 108 ins.	Not longer than 96 ins.	24	24	26	29		
	Longer than 96 ins. Not longer than 120 ins.	25	25	27	30		
	Longer than 120 ins.	26	26	28	32		
Wider than 108 ins.	Not longer than 132 ins.	27	27	29			
	Longer than 132 ins.	28	28	31			

Rolled Round Copper, ⅜ inch diameter or over, 23 cents per pound. (Cold Drawn, Square and Special Shapes, extra.)

Circles, Segments and Pattern Sheets three (3) cents per pound advance over prices of Sheet Copper required to cut them from.

All Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, one (1) cent per pound over the foregoing prices.

All Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, two (2) cents per pound over the foregoing prices.

Cold Rolled and Annealed Copper, Sheets and Circles, wider than 17 inches, take the same price as Cold or Hard Rolled Copper of corresponding dimensions and thickness.

All Polished Copper, 20 inches wide and under, one (1) cent per pound advance over the price for Cold Rolled Copper.

All Polished Copper, over 20 inches wide, two (2) cents per pound advance over the price for Cold Rolled Copper.

Planished Copper, one (1) cent per pound more than Polished Copper.

Cold Rolled Copper prepared suitable for polishing, same prices and extras as Polished Copper.

Tinning Sheets, on one side, 2½c. per square foot.

For tinning both sides, double the above price.

For tinning the edge of sheets, one or both sides, price shall be the same as for tinning all of one side of the specified sheet.

Metal Prices, March 7, 1906

Net Cash Prices.

COPPER BOTTOMS, PITS AND FLATS.

14 oz. to square foot, and heavier, per lb.....27c.
12 oz. and up to 14 oz. to square foot, per lb.....28c.
Lighter than 10 oz.....33c.
10 oz. and up to 12 oz.....30c.
Circle less than 8 in. diam., 2c. per lb. additional.
Circles over 13 in. diam. are not classed as Copper Bottoms.
Polished Copper Bottoms and Flats, 1c. per lb. extra.

PRICE LIST FOR ROLL AND SHEET BRASS.

Prices are for 100 lbs. or more of Sheet Metal in one order.

Brown & Sharpe's Gauge the Standard.

Common High Brass	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
Wider than and including	2 12	12 14	14 16	16 18	18 20	20 22	22 24	24 26	26 28	28 30
To No. 20 inclusive..	.22	.23	.25	.27	.29	.31	.33	.36	.39	.42
Nos. 21, 22, 23 and 24	.22	.24	.26	.28	.30	.32	.34	.37	.40	.43
Nos. 25 and 26.....	.23	.24½	.27	.29	.31	.33	.35	.38	.41	.44
Nos. 27 and 28.....	.23	.25	.28	.30	.32	.34	.36	.39	.42	.45

Add ½ cent per lb. additional for each number thinner than Nos. 28 to 38, inclusive.

Add 7 cents per lb. for sheets cut to particular lengths, not sawed, of proportionate width.

Add for polishing on one side, 40 cents per square foot; on both sides, double this price.

Brazing, Spinning and Spring Brass, 1 cent more than Common High Brass.

Extra Quality Brazing, Spinning and Spring Brass, 2 cents more than Common High Brass.

Low Brass, 4 cents per lb. more than Common High Brass.

Gilding, Rich Gold Medal and Bronze, 7 cents per lb. more than Common High Brass.

Discount from list 17½ per cent.

PRICE LIST FOR BRASS AND COPPER WIRE.

BROWN & SHARPE'S GAUGE THE STANDARD.	Com. High Brass.	Low Brass.	Gilding Bronze and Copper.
All Nos. to No. 10, Inc.....	$0.23	$0.27	$0.28
Above No. 10 to No. 16.....	.23½	.27½	.28½
Nos. 17 and 18.....	.24	.28	.32
" 19 and 20.....	.25	.29	.33
No. 21.....	.26	.30	.34
" 22.....	.27	.31	.35
" 23.....	.28	.32	.36
" 24.....	.30	.34	.38

Discount, Brass Wire, 15 and 2½ per cent.; Copper Wire, 15 and 2½ per cent.

PRICES FOR SEAMLESS BRASS TUBING.

From 1¼ in. to 3½ in. O. D. Nos. 4 to 13 Stubs Gauge, 22c. per lb.
Seamless Copper Tubing, 25c. per lb.

For other sizes see Manufacturers' List.

PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

Iron Pipe size.	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Price per lb..	30	29	24	23	22	22	22	22	22	22	22	23	24	26	28	29

BRAZED BRASS TUBING.

Brown & Sharpe's Gauge the Standard.

Per lb.

Plain Round Tube, ¾ in. up to 2 in., t· No. 19, inc.....$0.35
" " " ⅝ " " ¾ " " 19, " 36
" " " ½ " " ⅝ " " 19, " 38
" " " ⅜ " " ½ " " 19, " 41
" " " ⅓ " " ⅜ " " 19, " 48
" " " ¼ " " ⅓ " " 19, " 65
" " " ⅛ " " ¼ " " 19, " 1.00
" " " ⅛ " " ⅛ " " 19, " 1.50
Smaller than ⅛ inch.....Special
2 inch to 3 inch, to No. 19, inclusive.....38
3 inch 40
Over 3 inch to 3½ inch.....45
Over 3½ inch.....50

Bronze and copper advance 3 cents. Discount 25 and 5 per cent.

PRICE LIST FOR SHEET ALUMINUM—B. & S. Gauge.

Wider than and including	*3in. .. 12in. in coils.	6in. 14in.	14in. 16in.	16in. 18in.	18in. 20in.	20in. 24in.	24in. 30in.	30in. 36in.	36in. 40in.	Cutting to Length.	Polishing or Satin Finishing one Side.
W. 13 and heavier..	44	44	46	46	46	46	49	49	49	1	2
" 14.....	44	44	46	46	46	46	49	49	49	1	2
" 15.....	44	44	46	46	46	46	49	49	49	1	2
" 16.....	44	44	46	46	46	46	49	49	49	1	2
" 17.....	44	44	46	46	46	46	49	49	49	1	3
" 18.....	44	44	46	46	46	46	49	49	52	1	3
" 19.....	44	44	46	46	46	46	49	50	53	1	4
" 20.....	44	46	46	46	46	48	51	52	54	1	4
" 21.....	44	48	48	48	48	50	53	54	60	2	5
" 22.....	44	48	48	48	50	50	53	57	61	2	5
" 23.....	44	48	48	48	50	50	53	59	62	2	6
" 24.....	44	48	50	52	52	52	55	61	64	2	6
" 25.....	46	49	51	53	53	53	56	63	67	2	7
" 26.....	46	49	52	56	56	56	61	65	71	2	8
" 27.....	46	50	54	58	58	59	64	68	74	2	10
" 28.....	46	50	56	58	59	59	66	72	77	2	11
" 29.....	48	51	58	60	62	62	71	77	82	2	13
" 30.....	48	52	60	62	66	72	79	82	87	2	15
" 31.....	50	54	62	65	70	78	81	84	90	3	17
" 32.....	52	56	64	68	76	84	91	97	102	3	19
" 33.....	54	58	67	72	80	91	98	107	117	3	21
" 34.....	57	62	69	77	85	98	110	117	127	3	25
" 35.....	..	72	77	87	97	107	122	132	..	..	..*
" 36.....	..	87	97	107	122	127	142	..	..	..	..
" 37.....	..	102	112	127	142	157	172	..	..	..	..
" 38.....	..	122	137	152	167	182	202	..	..	..	..
" 39.....	..	142	162	182	202	222	..	..	..	..	..
" 40.....	..	172	202	222	242	..	..	..	..	..	..

*Polished or scratch brushed 2 sides, double above prices.

In flat rolled sheets the above prices refer to lengths between 2 and 8 feet. Prices furnished by the manufacturers for wider and narrower sheet. All columns except the first refer to flat rolled sheet. Prices are for 50 lbs. or more at one time. Less quantities 5c. lb. extra. Charges made for boxing.

PRICE LIST OF SEAMLESS ALUMINUM TUBING—STUBS' GAUGE.

Stubs' G.	¼"	⅜"	½"	⅝"	¾"	1"	1½"	2"	2½"	2¾"
4 to 11....	..	..	96	86	83	77	67	61	61	61
12.....	..	1.08	96	86	83	77	67	61	61	61
13.....	..	1.08	96	86	83	77	67	64	64	64
14.....	..	1.08	96	86	83	77	67	64	64	64
15.....	..	1.12	96	89	86	80	70	67	67	67
16.....	..	1.15	99	93	89	83	70	70	70	70
17.....	..	1.18	1.02	96	93	86	73	73	73	73
18.....	1.85	1.24	1.05	99	93	86	77	77	77	80
19.....	1.88	1.28	1.08	1.02	99	93	83	80	80	83
20.....	1.95	1.31	1.15	1.08	1.05	99	89	86	86	89
21.....	2.01	1.37	1.21	1.15	1.12	1.05	99	93	93	96
22.....	2.17	1.44	1.24	1.18	1.15	1.08	1.05	99	1.05	1.05
23.....	2.33	1.50	1.31	1.24	1.21	1.15	1.15	1.08	1.15	1.15
24.....	2.48	1.60	1.37	1.31	1.28	1.18	1.21	1.21	1.24	..
25.....	2.65	1.69	1.47	1.37	1.34	1.28	1.34	..	..	..

Prices are for lots of 50 lbs. Boxing extra. Smaller, larger and intermediate sizes furnished by manufacturers.

PRICE LIST FOR ALUMINUM ROD AND WIRE—B. & S. GAUGE.

Diameter B. & S. G'ge.	0000 to No. 10.	No. 11.	No. 12.	No. 13.	No. 14.	No. 15.	No. 16.	No. 17.	No. 18.	No. 19.	No. 20.	No. 21.	No. 22.
Price, per lb....	40	40½	40½	41	41½	42	42½	43	44	45	46	49	54

200 lbs. to 30,000 lbs., 3 cents off list; 30,000 lbs. and over, 4 cents off list.

PRICE LIST FOR GERMAN SILVER IN SHEETS AND ROLLS.

Per cent.	Price per lb.	Per cent.	Price per lb.
12.....	$0.52	16.....	.58
13.....	.53	17.....	.59
14.....	.54	18.....	.60
15.....	.55		

These prices are for sheets and rolls over 2 inches in width, to and including 8 inches in width and to No. 20, inclusive, American or Brown & Sharpe's Gauge. Prices are for 100 lbs. or more of one size and gauge in one order. Discount 50 per cent.

Munts or Yellow Metal Sheathing (14" x 48") .....18c. lb. net base.
" " " Rectangular Sheets other than Sheathing ....20c. " " "
" " " Rod ....19c. " " "
Tobin Bronze Rod..... .....21c. " " "
Above are for 100 lbs. or more in one order.